Trends in Household Consumption Inequalities in Slovakia: Empirical Evidence[1]

Brian KÖNIG – Gabriela DOVÁĽOVÁ***

Abstract

The article deals with consumption inequalities in Slovakia. Analysing household consumption behaviour is very important due to the existence of linkages between consumption and development on the labour market and it is also particularly important in regard to population ageing, as Slovakia belongs to the group of EU Member States moving from the youngest population at present to the oldest ones in the future. Through identifying expenditure elasticities by employing the Quadratic Almost Ideal Demand System (QUAIDS) in the analysis of nine groups of consumer goods and services we were able to define what low and high income households consider luxury goods and necessity goods. The results suggest that the development of income inequalities in Slovakia is not fully traced by consumption inequalities and that the financial and economic crisis has played an important role in determining consumption inequalities between low and high income households.

Keywords: *QUAIDS model, expenditure elasticities, income, consumption, inequalities*

JEL Classification: C50, D12, E21

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Introduction

In recent years, when the majority of European countries need to deal with low economic growth, ongoing debt crisis, problems on the labour market, discussions related to household consumption have more often come to the fore. Household consumption is expected to be one of the main drivers of economic growth in Slovakia in the coming years. In 2014 after years of stagnation and decline household consumption finally slightly recovered from the crisis and had a positive contribution to economic growth. However, according to Eurostat data, in 2014 Slovakia ranked fourth among the Eurozone´s (EA 19) poorest countries in terms of actual individual consumption, which is also reflected in the structure of consumer expenditure. What is perceived as problematic is a persistently high share of consumer spending on essential goods and services (food and energy), which, in the light of income and price development, does not provide room for greater variability in consumer behaviour in the majority of Slovak households.

Examining consumer behaviour in more detail seems to be of importance mainly because of the existence of linkages between consumption and employment effects. As it turns out, households tend to postpone consumption into the future due to the uncertainty of economic development, which in turn affects production capacity and the labour market. In the difficult economic situation, which is characterized by increasing pressure to consolidate public finances and reduce expenditure on social protection, difficulties with entry to new foreign markets, as well as by unfavourable demographic development, the household consumption behaviour and key determinants of household consumption patterns have become increasingly important.

The increasing polarization in society also contributes to the complexity of the situation as Slovakia belongs to the two thirds of the EU Member States in which income inequality and the incidence of low wage work increased between 2006 and 2011 (Dreger et al., 2015). Wage inequalities are very closely linked to persistent problems on the labour market, where the long-term unemployment rate remains one of the highest among EU Member States. What is also problematic is the high rate of very long-term unemployment (unemployed for more than 24 months), which was at the level of 6.6% (in % of active population) in 2014 in Slovakia, which is more than twice as much as the EU-15 average. Long-term unemployment is closely related to the issue of employing low-skilled workers, whose unemployment rate (38.5%) was in 2015 higher approximately by 27 percentage points (p.p.) than the overall unemployment rate (11.5%). The process of reducing earning inequality may be slowed down by the fact that the employment rate of low-skilled labour force is very little sensitive

to the economic growth rate. Previous research in this field showed that the threshold of the real gross value added growth at which employment in this segment starts to increase is on average at the level of 10% (Morvay, 2014). According to the NBS (2015) prognosis, the Slovak economy is expected to grow by 3.8% in 2016 and by 3.5% in 2017, which is a clear signal to economic policy that economic growth is not a sufficient condition for solving this problem and more effort is needed in this field.

The main purpose of this paper is to draw attention to trends in consumption inequality in Slovakia. Furthermore, we seek to verify if income inequalities deepened by the financial and economic crisis are fully transformed into consumption inequalities and if growing income inequalities cause that luxury goods and services are becoming less affordable for low-income households and, on the other hand, the consumption of high-income households has shifted more towards luxury goods. Our analysis also provides a picture of consumer behaviour from the perspective of how households change their expenditures on goods and services in response to changes in prices and incomes. Using households´ longitudinal micro data from the Household Budget Survey we employ the Quadratic Almost Ideal Demand System (QUAIDS) in the analysis of nine groups of consumer goods and services. More in-depth research in the field of income elasticities for the individual groups of goods and services in combination with the analysis of the propensity to save and wage and price developments allows us to better document the evolution of inequalities in consumption during the particular periods (pre-crisis 2004 – 2008, the onset of the crisis 2009 – 2012).

The results suggest that the development of income inequalities is not fully tracked by consumption inequalities in Slovakia and that the financial and economic crisis has played an important role in determining consumption inequalities between low and high income households.

The paper is structured as follows: first we focus on the literature dealing with consumption and income inequalities.

Further on, the section deals with papers aimed at demand analysis based on micro data.

The methodology of the QUAIDS demand system can be seen in Section 2.

Section 3 is focused on the data used and the process of aggregation and imputation of new price indices.

Some issues regarding the model estimation process and its verification are considered in Section 4.

Finally, the final part investigates the findings in the area of expenditure elasticities and resulting household consumption inequalities are discussed.

1. Review of Literature

Although consumption is considered a better measure of household well-being than income, a much larger body of research papers deals with income inequalities and there is still relatively little work done on corresponding changes in the consumption distribution under the conditions of Slovakia. One of the reasons is the limited availability of data on household consumption. Comparable micro data are only available from 2004 to 2012, while for years 2013 and 2014 only simulated data are available.

Several publications have appeared in recent years using micro data from the Social Insurance Agency in Slovakia and documenting the reduction of income inequalities in Slovakia before the recession and their augmentation in the period after the onset of the crisis, when, in average terms, net incomes at the top of the income distribution continued to grow more rapidly than for the rest of the population while for those in the lower parts of the distribution they kept on decreasing (e.g. Pauhofová and Martinák, 2014). The EU statistics on income and living conditions (SILC), used by other authors (e.g. Kahanec et al., 2012), showed very similar results.

Much more research on the examination of the relationship between income and consumption inequalities has been done by foreign scholars. Several foreign authors have arrived at similar findings indicating that income inequality is higher and has grown faster than consumption inequality (e.g. Jappelli and Pistaferri, 2009 – in case of the Italian economy; Blundell, Pistaferri and Preston, 2008 – under conditions in the United States; Blundell and Preston, 1998 – for the United Kingdom). The results obtained by Hasset and Mathur (2012) suggest that in terms of US economy consumption inequality narrows in periods of recessions such as the recent recession of 2007 – 2009. The authors argue that higher-income households have more invested in the economy and therefore they are hit harder by business-cycle shocks. They can also experience negative income and wealth effects in a given period that affect their ability to maintain the same level of consumption. Another important paper in recent literature comes from Aguiar and Bils (2015), who showed, on the basis of data from the Consumer Expenditure Survey´s interview sample since 1980, that consumption inequalities have tracked income inequalities much more closely than estimated by direct responses on expenditures. They focused more on estimating how different income groups shifted their expenditures towards luxuries and necessities over time.

Since there are a number of especially foreign studies analysing the demand theory based on the QUAIDS model, we mention just a few of them. First we focus on fundamental work which the QUAIDS model is based on. It is an almost ideal demand system (AIDS) devised by Deaton and Muellbauer (1980)

for which authors were recently awarded the Nobel Price (2015). Deaton and Muellbauer (1980) applied the AIDS model on British data and they concluded that the model is able to explain high proportion of the variance of the commodity expenditure shares. Later on, an enlargement of the AIDS model was constructed by Banks, Blundell and Lewbel (1997), who adjusted the model by using a quadratic term in the expenditure share equation. Their main objective was to provide detailed results considering the appropriate form of consumer preferences that takes account of generalizations in the shape of the Engel curve. Such results allow for the impact analysis of the indirect tax reform. Estimation results were compared to outcomes obtained by static simulation. Janda, Mikolášek and Netuka (2010) examined the influences of tax interventions made by fiscal policy on the alcohol beverages market in the Czech Republic. While the effects of the tax changes are strongly dependent on the microeconomic behaviour of consumers, the authors adopted the QUAIDS model and calculated price and income elasticities for the key alcohol beverages on the basis of Czech Household Budget Survey (HBS) data. The effects of changes in value added tax (VAT) rates in the Czech Republic on household consumption were investigated by Janský (2013). Janský estimated the behavioural responses of consumers to price changes resulting from VAT changes based on the QUAIDS model. Price and income elasticities based on the HBS data were also investigated by Dybczak, Tóth and Voňka (2014). These authors focused on the determination of luxury and necessity goods in Czech households. Based on the results they concluded that clothing, transportation, education and leisure represent luxury goods and food, energy, health and body care are considered necessity goods.

With regard to the Slovak economy, demand analysis based on micro data is considerably less elaborated. Recently, Cupák, Pokrivčák and Rizov (2015) applied the QUAIDS model to Slovak HBS data focusing on food consumption and showing the inequality in households' diet, as vegetables and fruits are still considered luxuries for certain income groups. Expenditure elasticities in Slovakia on the basis of the microdata and the same method were also calculated by Lichner and Petríková (2014). They investigated the expenditure elasticities based on different age and economic activity groups. But a comprehensive study on consumption inequalities based on the Slovak Household Budget Survey (HBS) micro data is still missing.

2. Methodology

The examination of trends in consumption inequalities in the context of economic, wage and labour market development is particularly important in regard to population ageing, as Slovakia belongs to the group of EU countries moving

from the youngest population at present to the oldest ones in the future. Population ageing together with the increasing polarization in society can lead, to a greater extent, to changes in the amount and structure of aggregate consumption, which can in turn influence employment and sectorial production.[2]

What very often seems problematic in connection with the increasing inequalities is that high-income households tend to take into consideration not only their current, but also future needs, which may be manifested in two ways: first, high--income households tend to spend more on financial products such as insurance, retirement programs, while low-income households tend to rely more on the social security system (e.g. shown by Zumbrun, 2015 in the US context), and they tend to invest more in their offspring than low-income households, which makes social mobility more difficult (e.g. shown by Becker et al., 2015 in the US context).

We are aware of the complexity of this issue. Based on recent foreign studies (e.g. Aguiar and Bils, 2015), we present the main results reached by means of modelling techniques in the context of Slovakia to verify if income inequalities are fully transformed into consumption inequalities and if growing income inequalities cause that luxury goods and services are becoming less affordable for low-income households and, on the other hand, the consumption of high-income households has shifted more towards luxury goods. The results provide a good foundation for economic policy implications.

In order to investigate the consumption behaviour of Slovak households and to reflect expenditure elasticities, we use the QUAIDS model devised by Banks, Blundell and Lewbel (1997). The QUAIDS model is an extension of the model called AIDS by Deaton and Maellbauer (1980), which additionally allows for the consideration of quadratic Engel curves. As a result of the quadratic form, a good may be luxurious at a certain level of income, but it may become a necessity good if income changes. The QUAIDS model considers consumer demand for a set of *n* goods that the consumer procures on *m* monetary units. In our case, the *n* goods express aggregate expenditure categories divided according to the classification of individual consumption by purpose (COICOP) such as food, alcoholic beverages, clothing and footwear etc. and *m* expresses total expenditure of individual household incurred on the various expenditure categories.

Generally, the QUAIDS model is based on the indirect utility function $V(\mathbf{p}, m)$ expressed as:

$$\ln V(\mathbf{p}, m) = \left[\left(\frac{\ln m - \ln a(\mathbf{p})}{b(\mathbf{p})} \right)^{-1} + \lambda(\mathbf{p}) \right]^{-1} \tag{1}$$

[2] The consumption structure of pensioners is different compared to economically active people.

where

p – a price vector,

functions ln$a$ (**p**), b (**p**), λ (**p**) – expressed as follows:

$$\ln a(\mathbf{p}) = \alpha_0 + \sum_{i=1}^{n} \alpha_i \ln p_i + \frac{1}{2} \sum_{i=1}^{n} \sum_{j=1}^{n} \gamma_{ij} \ln p_i \ln p_j \tag{2}$$

$$b(\mathbf{p}) = \prod_{i=1}^{n} p_i^{\beta_i} \tag{3}$$

$$\lambda(\mathbf{p}) = \sum_{i=1}^{n} \lambda_i \ln p_i \tag{4}$$

where

p_i and p_j – the price of the i-th good,

j-th good[3] and b(**p**) – the Cobb-Douglas price aggregator.

Furthermore, the QUAIDS model defines the expenditure shares of the particular expenditure as a proportion of the product of the number of items q_i in the expenditure category and related prices p_i divided by total amount of household money incurred on the expenditure categories m as $w_i = p_i q_i / m$. After application of Roy's identity[4] to the equation (1), expenditure share w_i is given as:

$$w_i = \alpha_i + \sum_{j=1}^{n} \gamma_{ij} \ln p_j + \beta_i \ln\left(\frac{m}{a(\mathbf{p})}\right) + \frac{\lambda_i}{b(\mathbf{p})}\left[\ln\left(\frac{m}{a(\mathbf{p})}\right)\right]^2, \quad i = 1, \ldots, n \tag{5}$$

Based on microeconomic theory, the model imposes additional restrictions on parameters expressed as follows:

$$\sum_{i=1}^{n} \alpha_i = 1, \ \sum_{i=1}^{n} \beta_i = 0, \ \sum_{j=1}^{n} \gamma_{ij} = 0, \ \sum_{i=1}^{n} \lambda_i = 0, \ and \ \gamma_{ij} = \gamma_{ji} \tag{6}$$

Expenditure elasticities ε_i are in the model of Banks, Blundell and Lewbel (1997) expressed through the derivative of function (5) with respect to ln$m$ to obtain:

$$\mu_i = \frac{\partial w_i}{\partial ln m} = \beta_i + \frac{2\lambda_i}{b(p)}\left[\ln\left(\frac{m}{a(\mathbf{p})}\right)\right] \tag{7}$$

[3] In our case, good i represents i^{th} expenditure category.

[4] Generally, Roy´s identity says that consumer demand for good i can be expressed as a partial derivative of the indirect utility function with respect to the price of the ith good divided by the partial derivative of the indirect utility function with respect to income.

Following expression (7), the related expenditure elasticity can be defined as

$$\varepsilon_i = 1 + \mu_i / w_i \tag{8}$$

Similarly, the uncompensated (or Marshallian) price elasticities are expressed using the partial derivative of expenditure shares with respect to $\ln p_j$:

$$\mu_{ij} = \frac{\partial w_i}{\partial \ln p_j} = \gamma_{ij} - \mu_i \left(a_j + \sum_k \gamma_{jk} \ln P_k \right) - \frac{\lambda_i \beta_j}{b(\mathbf{p})} \left[\ln \left(\frac{m}{a(\mathbf{p})} \right) \right]^2 \tag{9}$$

Then the uncompensated price elasticities are given by

$$\varepsilon_{ij}^u = -\delta_{ij} + \mu_{ij} / w_i \tag{10}$$

where δ_{ij} is Kronecker delta equal to 1 if $i = j$ and equal to 0 if $i \neq j$. The compensated (or Hicksian) price elasticities can be defined using the Slutsky equation as

$$\varepsilon_{ij}^c = \varepsilon_{ij}^u + \mu_i w_j \tag{11}$$

3. Data

In order to estimate the QUAIDS model, two types of dataset were used. First, detailed microdata were adopted from HBS collected by the Slovak Statistical Office. For the purpose of our analysis, we employed data from the 2004 – 2012 period.

Additionally, it was necessary to use the second dataset, since HBS does not provide explicit price information for individual commodities. For that reason, the consumer price index (CPI) provided by Slovak Statistical Office was adopted. The key advantage of using these datasets is the fact that both are structured according to the classification of individual consumption by purpose (COICOP).[5]

For the purpose of the analysis we bundled commodities into nine relatively homogeneous groups using the COICOP classification: 1. Food and non-alcoholic beverages; 2. Alcoholic beverages, tobacco; 3. Clothing and footwear; 4. Housing, water, electricity, gas and other fuels; 5. Furnishings, household equipment and routine household maintenance; 6. Health; 7. Transport + Communication and Postal services; 8. Recreation and culture + Restaurants and hotels, 9. Other goods and services.

[5] Expenditure commodities in the HBS as well the as consumer price index are structured according to the COICOP.

In order to provide the detailed consumer demand analysis depending on availability of individual prices of particular commodities differentiating across households, additional information on physical amounts consumed was needed. Since the HBS does not provide information on the physical amount of units consumed by individual households and collects mostly data on expenditures spent, we follow the approach of Dybczak et al. (2014) and we impute individual prices of particular households in our own manner. Unlike Dybczak et al. (2014) we did not calculate physical amounts consumed. We matched weighted CPI indexes from the Slovak Statistical Office with each commodity subgroup and we calculated the aggregate price index of an expenditure group as a weighted average of CPI indexes, whereby weights were computed individually for every single household as the expenditure share of an individual expenditure subgroup on the total expenditure group. As a result we got differentiating prices across households as a reflection of different expenditures spent on individual subgroups. When all twelve price indexes of COICOP classification were calculated, we bundled them into the nine aforementioned categories, whereby joint aggregate categories (7 – 9) were computed as the weighted average of individual categories.

In order to avoid the biased outcomes of our estimates, some adjustments of the data used had to be performed. At first there was an effort to track the consumption structure only for households with a possible economically active head for the purpose to evading families whose head had already retired and at the same time comparing only homogeneous groups. Therefore, we decided to omit observations where the head of household was younger than 25 or older than 62. Since we do investigate consumption inequalities between the poor and the rich, we decided to divide households in a similar manner as Aguiar et al. (2015) according to the net income but attributable to the member of household and not to the household as a whole. This adjustment was performed in order to distinguish among households with the same net income but a different number of persons living out of the household budget. For that reason we defined the "low-income" households as households with the net income per person lower than the 20^{th} percentile and the "high-income" households as those with the net income per person higher than the 80^{th} percentile. There was also a possibility to use some kind of adult equivalence weights to differentiate among households with equal household members but different age structure (varying in the structure of adults and children,) but based on the Short et al. (1999) study there are similar rankings of households in the case of using equivalence weights or simple measure per capita (income/ expenditure), since we abstracted from the adult equivalence weights.

Due to the existence of extreme values in the net income observations we decided to exclude households with the net income lower than the 5^{th} and higher

than the 95th percentile.[6] In the first (2004 – 2008) and the second (2009 – 2012) period we analysed 5,215 and 4,507 households in total, respectively. Out of these observations 2,591 and 2,242 households belonged to the low-income group, while 2,624 and 2,265 belonged to the high-income group. In order to avoid biases arising from the presence of the outliers in price indexes we removed all observations below the first and above the last percentile in each commodity group.

4. Estimation

For the purpose of the empirical analysis of consumption behaviour of low and high income households the QUAIDS model designed by Banks, Blundell and Lewbel (1997) was adopted. In the parameter estimation procedure, we used an approach designed by Poi (2012), who constructed a STATA software code that can be used to estimate the QUAIDS model through an iterative nonlinear generalized least squares method, which is equivalent to a multivariate maximum likelihood estimator. Previously mentioned STATA software code also allows for post-estimation analysis which enables the computation of price and expenditure elasticities. Particular expenditure elasticities are calculated individually for each household using the expenditure shares w_i and the estimated parameters of the equation (5). Such computation allows the quantification of elasticities as the average value of each household's elasticities, also enabling to calculate the median value of individual elasticities.[7]

In order to verify the adequacy of using the QUAIDS model instead of its linear version, we followed Cupák, Pokrivčák and Rizov (2014), who formally tested the significance of the quadratic expenditure term. Verification was performed through the Wald test applied on the parameters λ_i belonging to the quadratic term in the expenditure share equation, whereby it was tested whether the quadratic term in the expenditure share equation plays a statistically significant role in the explanation of the expenditure behaviour. Since the χ^2 statistics was sufficiently high and *p*-value considerably below the generally accepted significance level of 5%, we denied the null hypothesis of lambdas being jointly equal to zero. Therefore, we claim that the use of the QUAIDS model instead of the linear version is reasonable.

[6] Similar bins of households were used in Aguiar et al. (2015) who examined income and consumption inequalities based on the ratio 80-95/5-20 percentile groups divided by before-tax income.

[7] The estimated parameters of the QUAIDS model with their significance levels can be provided upon request.

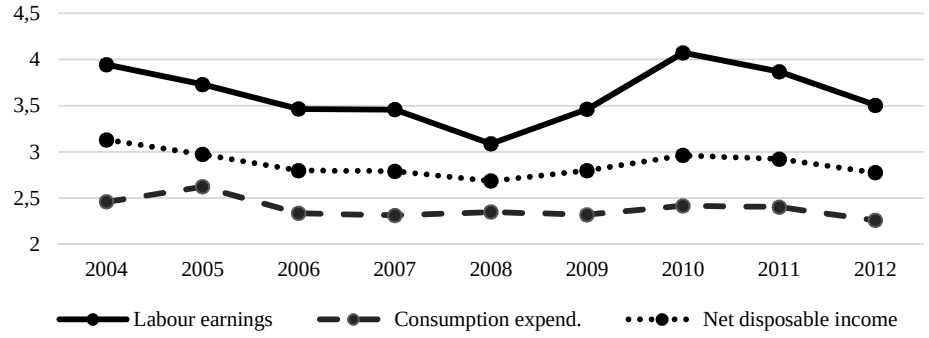
5. Results and Discussion

It can be expected that one of the main factors affecting the household consumption behaviour is household net disposable income per capita. In 2004, there could be seen a gap between the richest and poorest households in Slovakia as high-income households had net disposable income per capita more than 3.1 times as much as low-income households. Inequality among households increases as we consider only labour earnings. As shown in Figure 1, the positive economic development between 2004 and 2008 helped to shrink this labour income inequality, as the labour income of low-income households showed much stronger growth than the average of the total population. The general economic conditions after 2008 have disproportionally affected the employment of low--income and high-income households as low-skilled workers, who are mostly heads of low-income households, were hit hardest by the worsening situation on the labour market and therefore the crisis has had moderate negative effects on income and wage inequalities.

Figure 1 also shows that income inequality has not been fully followed by consumption inequality, as the high-income/low-income household's ratio for consumption expenditures remained flat between 2004 and 2012, which means very close to the level of 2.5.

F i g u r e 1

Income and Consumption Inequalities in Slovakia Based on the Ratio of High-income Households to Low-income Households (2004 – 2012)



Note: The Y – axis shows the ratio of high-income to low-income household net disposable income, labour earnings and consumption expenditures per capita. The calculation of the ratio takes the number of family members into consideration.

Source: Authors, based on HBSs.

The main determinants, which significantly affect the trend in consumption inequalities, include a combinations of factors such as: economic development and social policy measures including government measures focusing on the mitigation

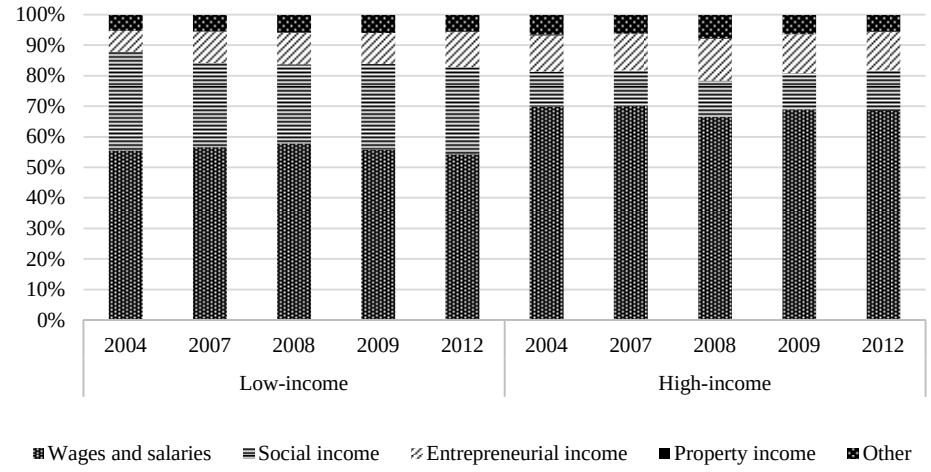
of financial and economic crisis effects; an increase in the disposable income of high-income households has been not fully reflected in the growth of consumption expenditures, but rather in the increase of savings; development of prices; changing consumer preferences and increasing possibilities to shift expenditures towards cheaper substitutes and the better accessibility of consumer loans.

Social protection has played a key role in supporting vulnerable low-income households and preventing a significant decline in consumption spending, mainly during the period of economic downturn. The government scaled up public social expenditures from 16.1% of GDP in 2008 to 18.8% of GDP in 2009 followed by a slight decrease to 18.4% of GDP in 2012.

As can be seen from Figure 2, over the last decade, social income targeted toward low-income families has been an important source of their purchasing power. The decrease in the proportion of the social income to their total household income could be seen in the pre-crisis period (from 32% in 2004 to 26% in 2008) as the proportion of the labour income was increasing and was driven by employment growth and growth in labour force earnings. A notable change could be seen between 2008 and 2009 as the share of labour income in total income for households in the bottom 5 – 20th percentiles decreased from 58% in 2008 to 55.8% in 2009 and it did not reach the pre-crisis value until 2012. The long-term high proportion of social income in this group of households indicates that the labour force participation and employment of low-qualified people are significantly influenced also by other factors than just by fluctuations in economic development.

F i g u r e 2

The Composition of Household Income in Selected Years



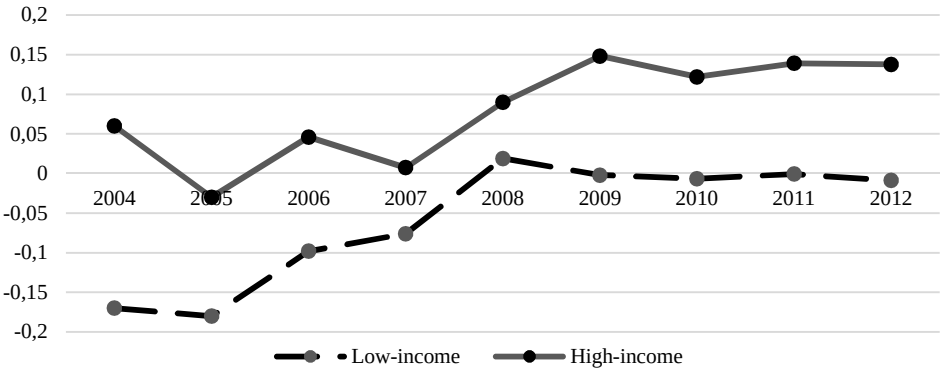
Source: Authors, based on HBSs.

Labour income is a major source of income also for households in the top 80 – 95th percentiles. As property income has played only a very minor role in their total household income (between 2004 – 2012 it was not higher than 0.3%) and entrepreneurial income was very stable and not very significantly different in relative terms than for low-income households (on average, very close to the level of 12%), the largest source of household income inequalities are inequalities on the labour market.

Figure 3 represents households' propensity to save between 2004 and 2012. The positive economic conditions between 2004 and 2007 positively affected households' behaviour towards willingness to take on more risk and low-income households, on average, increased consumption expenditures faster than their net disposable income, resulting in a negative saving rate. This means higher debt accumulation (the possibility to use savings generated in a previous period for compensating the growing consumption expenditures is less likely due to the low average level of income in this group). On the contrary, high-income households did not fully transform the growth of net disposable household income per capita into the growth of consumption, but rather to the generation of savings, which has a favourable effect on reducing inequalities in consumption. After 2008, due to negative expectations and the existence of precautionary motives related to the economic downturn, both types of households reduced consumption expenditures. High-income households increased their propensity to save, while low-income households reconsidered their previous negative formation of savings. On this basis, as could be seen on Figure 1, during the crisis the ratio of high-income to low-income household consumption expenditures slightly increased.

F i g u r e 3

Low-income and High-income Households' Propensity to Save between 2004 and 2012



Note: A household saving rate is calculated as the ratio of household savings per capita to household disposable income per capita.

Source: Authors, based on HBSs.

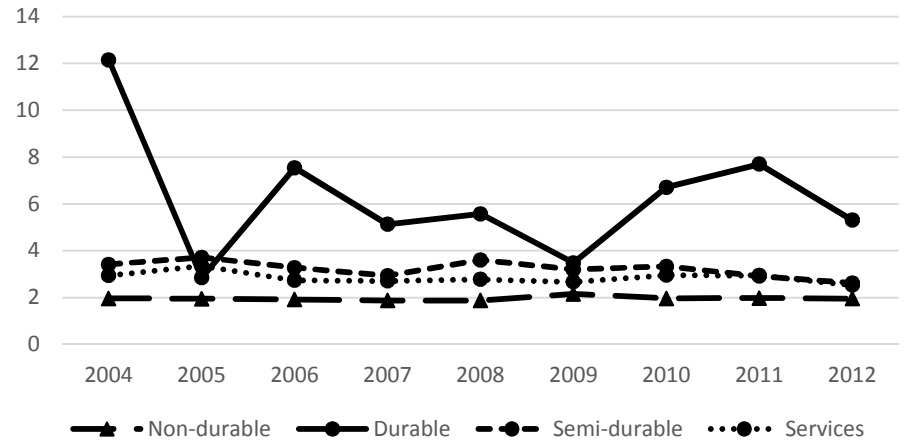
The analysis of household consumption behaviour by means of durability classification indicates that the negative effects of the financial and economic crisis on consumption inequalities could be seen in several areas.

First of all, as several recent foreign studies (e.g. Black and Cushbert, 2010) indicated, spending on durable goods tends to be more cyclical than spending on non-durable goods as the consumption of durable goods can be more readily postponed in the times of economic weakness. Uncertainty associated with the recession after the financial crisis discouraged low-income households from making purchases of durable goods to a greater extent than high-income households.

Figure 4 illustrates the decreasing ratio of high-income to low-income household reported expenditures on durable goods in the pre-crisis period and the opposite trend during the recession. Due to the uncertainty, households reduced spending in particular on those items which created the highest share of spending on durable goods before the crisis: expenditures on furniture, cars and appliances. As the automobile industry has been among the sectors that have been hit most by the recession, the government has introduced a car scrapping scheme to boost sales and to prevent rising inequalities through an increasing unemployment rate.

F i g u r e 4

Differences in Households´ Consumption Expenditures



Note: The Y-axis shows the ratio of high-income to low-income households' consumption expenditures on the different groups of goods and services.

Source: Authors, based on HBSs.

Closer look at the consumption in terms of the ratio of high-income to low--income household consumption expenditures has shown that in the period between 2004 and 2012 the lowest discrepancies between low-income and high--income households were in the share of total expenditure on non-durable goods.

As can be seen from Figure 4, during almost the whole period from 2004 to 2012, non-durable expenditures of high-income households per capita were two times higher than those of low-income households.

The crisis has had a direct impact on the ability of low-income households to pay for services, which create the second highest share of total household expenditures in terms of durability classification. Low-income households, whose consumption is more present-oriented, reduced, for example, the share of education expenditure in total household spending, which was at very low levels compared to the EU average even in the pre-crisis period. Inequality in education expenditure deepened, as low-income households' education expenditure reached 87.4% of that of high-income households in 2008, but only 58% in 2009.

As shown before, the financial and economic crisis was an important moment in terms of the development of inequalities in Slovakia. Due to the different household income development in the pre-crisis period (2004 – 2008) and thereafter (2009 – 2012), it was essential to split our dataset accordingly and to compute expenditure elasticities individually for each sample. Based on QUAIDS estimates, we investigated expenditure elasticities belonging to the groups of low-income and high-income households in each sample. Such data processing enabled us to find out whether the worsening economic situation caused by the crisis was reflected by the shifts of certain expenditure groups from necessity goods to luxury ones. Estimation based expenditure elasticities for low-income households for both periods are provided in Table 1.

T a b l e 1

Medians of Expenditure Elasticities for 2004 – 2008 and 2009 – 2012, the Group of Low-income Households (the 5 – 20 percentile of net income divided by number of family members)

Expenditure group	1. Food and non-alcoholic beverages	2. Alcoholic beverages, tobacco	3. Clothing and footwear	4. Housing, water, electricity, gas and other fuels	5. Furnishings, household equipment and routine household maintenance	6. Health	7. Transport + Communication and Postal services	8. Recreation and culture + Restaurants and hotels	9. Other goods and services
2004 – 2008									
Expenditure elasticity	0.354	-0.048	0.611	0.951	6.489	1.066	1.260	2.736	0.562
2009 – 2012									
Expenditure elasticity	0.555	0.807	1.249	0.696	8.825	0.873	-0.452	4.129	0.419

Source: Authors, based on HBSs.

Based on Table 1, we can observe that during the pre-crisis period, with the exception of the group of Alcoholic beverages, all the expenditure elasticities are positive. Four of our commodity groups can be considered luxury goods[8] for low-income households: 5. Furnishings, household equipment and routine household maintenance – with the highest level of expenditure elasticity, this group contains relatively expensive electronic equipment and is represented by a very small expenditure share;[9] 6. Health – healthcare in Slovakia is mainly financed through mandatory health insurance. Out-of-pocket payments are the second most important source of health care financing after public finances. As shown before (e.g. Radvanský and Dováľová, 2013), between 2000 and 2010 the increasing share of out-of-pocket payments was one of the highest among EU-27 countries, which contributed to the fact that in the pre-crisis period health expenditures had risen more than proportionate to changes in income; 7. Transport + Communication and Postal services; 8. Recreation and culture + Restaurants and hotels – which represents almost an unaffordable expenditure group for low--income households. Since the start of the economic crisis, the situation has changed to a certain extent. As a result of increased unemployment and worsening income conditions, low-income households became more sensitive to their level of income with respect to mainly the following groups: 1, 2, 5, and 8, respectively, as the increase of elasticity can be seen in each group. Group 3 represents a special case where the commodity group shifted from necessity goods to luxury ones, as its elasticity rose approximately from 0.61 to 1.25. On the contrary, a reverse tendency can be seen in the case of commodity group 6, which moved from luxury goods to necessity ones.

In the case of high-income households, the situation seems to be slightly different. It seems that during the pre-crisis period better situated households had saturated needs in the area of food commodities. For that reason they did not respond significantly to income changes in this commodity group. Similar to low-income households, expenditure elasticity higher than 1 during both periods was achieved only in commodity groups 5, 8. As necessity goods we consider groups 1, 4 and 9. Concerning the changes in commodity types, a similar movement in category 3 can be observed in high-income households as it was in the case of low-income households. The group of clothing shifted from necessity goods in the pre-crisis period to luxury goods after the crisis, since the value of its elasticity increased above one.

[8] Based on microeconomic theory, a commodity is considered a luxury good if income elasticity is higher than one and as a necessity good if income elasticity is in the interval from zero to one.

[9] As stated in Poi (2012), if the expenditure shares of some commodity group are close to 0, then the expenditure elasticity should be very large in magnitude, since the expenditure share is placed in the denominator in the expenditure elasticity equation.

T a b l e 2

Expenditure Elasticities for 2004 – 2008 and 2009 – 2012, the Group of High-income Households (the 80 – 95 percentile of net income divided by number of family members)

Expenditure group	1. Food and non-alcoholic beverages	2. Alcoholic beverages, tobacco	3. Clothing and footwear	4. Housing, water, electricity, gas and other fuels	5. Furnishings, household equipment and routine household maintenance	6. Health	7. Transport + Communication and Postal services	8. Recreation and culture + Restaurants and hotels	9. Other goods and services
2004 – 2008									
Expenditure elasticity	0.112	-0.122	0.640	0.967	5.915	1.086	1.229	2.176	0.558
2009 – 2012									
Expenditure elasticity	0.401	0.810	1.168	0.650	8.101	0.863	-0.532	3.110	0.428

Source: Authors, based on HBSs.

In order to analyse the consumption structure of examined income households groups (low-income and high-income) we use commodity bundles identified by tables 1 and 2. As can be seen in the previous tables, necessity goods during the pre-crisis and post-crisis period for both types of households were represented by commodity groups 1, 4, 9. Luxury goods are represented by groups 5 and 8. The other groups cannot be incorporated into these categories, since they have been changing during the observed periods and across both types of households. For instance, the group of Alcoholic beverages and tobacco can be regarded as inferior goods in both types of households in the pre-crisis period, but after the crisis broke out this commodity group changed to necessity goods.

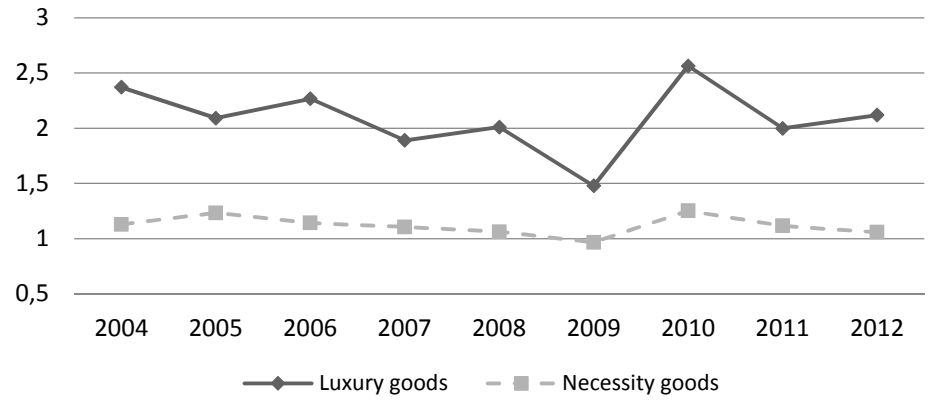
Resulting from Figure 5, we can observe that in the pre-crisis period consumption inequalities seemed to have a decreasing tendency based on the ratio of the total expenditure of high-income households spent on luxury/necessity goods to the total expenditure of low-income households spent on luxury/necessity goods. Since the economic crisis broke out we can observe a growing trend in consumption inequalities based on total expenditure ratios.

The financial and economic crisis caused that the poor cut back expenditures not only on luxury goods, but also on essential items. Engel´s coefficient (food expenditures as a proportion of total households spending) of low-income households reached 29% in 2008 and that of high-income households was 20.1%, declining by 1.5 p.p. for low-income families and increasing by 1.1 p.p. for high-income families compared to 2009. The decrease of Engel's coefficient

of low-income households was not caused by improving their living standard, but on the contrary, by the need to also restrict expenditures for food. Decreasing expenditures for food also led to changes in the quality and type of foodstuffs that were purchased. Inequalities related to the household diet increased as low--income households also needed to cut down expenditures on fruits and vegetables and to find cheaper alternatives (they increased the share of expenditures on bread and cereals).

F i g u r e 5

Ratio of Total Expenditures Spent by High-income to Low-income Households on Luxury and Necessity Goods over Time



Source: Authors, based on HBSs.

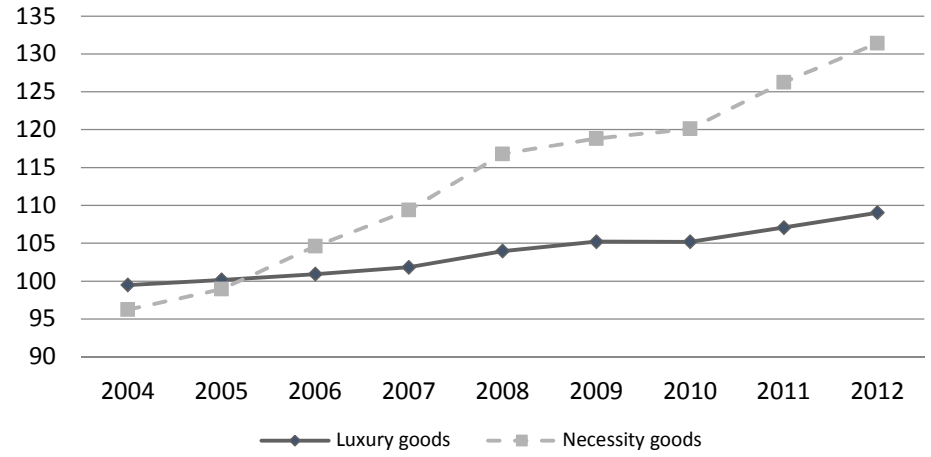
When analyzing consumption inequalities, it is essential to take a detailed look at the price movements of luxury and necessity goods (Figure 6).

Based on the results depicted in Figure 6, we can see that consumption inequalities were supported not only by increasing income disparities between low--income and high-income households, but also through the development of prices. The prices of the commodity group defined as luxury were moving up in a much slower manner compared to the prices of the necessity group. If we take a more in-depth look at the structure of luxury goods (based on our results consisting of groups 5 and 8 = 9 + 11 according to COICOP), we can see that the prices of group 5 (Furnishings, household equipment and routine household maintenance) registered even considerable deflation during observed years 2004 – 2008 (104.1 – 93.5). The prices of recreation and culture (9) were rising only slightly (99.7 – 104.4). The main source of the price growth of luxury goods is believed to be the commodity group of restaurants and hotels which noticed inflation in a larger magnitude (95.6 – 122.7). A different situation can be seen in the case of necessity goods (1, 4 and 9). The aggregate price index of food and non-alcoholic

beverages (1) increased from 102.4 to 124.6. The category of commodities belonging to housing, water, electricity, gas and other fuels (4) registered the fastest price increase (89.3 – 142.2) and the category of other goods (9) recorded a rise from 97.0 to 120.8. It is important to note that groups 1 and 4 cover approximately half of all expenditure spent by low-income households.

Figure 6

Development of Weighted Price Indexes of Luxury and Necessity Goods over Time (December 2005 = 100)



Source: Authors, based on HBSs.

Conclusion

The paper is a contribution to the ongoing discussion on income and consumption inequalities. In terms of income inequalities, the analysed period (2004 – 2012) can be split into two parts. First, the pre-crisis period was characterized by decreasing income inequalities. In the next period the high degree of uncertainty and the problematic labour market suffering from structural problems have sharpened household income inequalities. For the purpose of the analysis based on the QUAIDS model estimation, expenditure elasticities were computed. The results indicate that luxury goods are represented by commodity groups 5 and 8 respectively, and necessity goods are contained in groups 1, 4 and 9. Further significant findings show that the economic crisis effected the consumption patterns of Slovak households in term of households' response to income changes reflected in commodity group shifts from luxury goods to necessity goods and vice versa (for instance groups 3 and 6). The analysis has shown that although the income inequalities were not fully transformed into consumption inequalities

as the high-income/low-income household's ratio for consumption expenditures remained lowered compared to the ratio of net disposal income, but the development of consumption and disposal income inequalities seems to be significantly correlated. The evolution of consumption inequalities in Slovakia has been influenced by the combination of different determinants, while these factors played the key role: the development of prices – a higher value of the weighted price index for necessity goods than for luxury goods has been a significant obstacle mainly for low-income households, which have a higher share of expenditures on this type of goods; an increase in disposable income of high-income households has not been fully reflected in the growth of consumption expenditures, but rather in the increase of savings; economic development and social policy measures including government measures focusing on the mitigation of financial and economic crisis effects; changing consumer preferences and increasing possibilities to shift expenditures towards cheaper substitutes and the better accessibility of consumer loans. From the outcome of our research it is also possible to conclude that the following groups of goods and services are among those with the most responsive effects to income changes: furnishings, household equipment and routine household maintenance, recreation and culture, and hotel and restaurant services.

In conclusion, it is evident that this article has shown that in the pre-crisis period the positive economic development in terms of household incomes contributed to the fact that luxury goods have become more affordable also for low--income households, but this process was stopped by recession and negative expectations for the future. High-income households had also shifted consumption expenditures in the pre-crisis period more towards luxury goods, but after 2009 the dominance of precautionary motive in their consumption behaviour became apparent. For this reason, it has also been found that spending on durable goods tends to be more cyclical than spending on non-durable goods in the context of Slovakia and that the recession has a negative effect on deepening inequalities concerning these goods. Deepening inequalities in consumption caused by crisis can thus affect mainly the manufacturing sector of durable goods as well as services sector.

The main implication for economic policy is that the inequalities in household labour income are one of the main sources of household income inequalities in Slovakia, which are also reflected in consumption inequalities. Therefore, effective policy measures (e.g. active labour market policy, lifelong learning) favourable for increasing the employment of low-qualified people, who are mostly heads of low-income households, in combination with reasonably targeted social policy, can significantly influence the process of lowering consumption inequalities.

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