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Changes in Relative Material Deprivation in Regions of Slovakia and the Czech Republic

Summary: The aim of this article is to assess the level of relative material deprivation in the Czech and Slovak Republics and their regions. The first part of the article describes the level of households' equipment with utilities and durables using the 1991 and 2001 censuses. The second part is aimed at estimating the relative material deprivation in the Czech and Slovak regions using EU SILC 2006–2008 microdata, i.e. approximately 15 years after the split. The results indicate that there are significant differences in the relative material deprivation rates between the Czech Republic and Slovakia and among their regions. According to the results, the level of deprivation is higher in Slovakia, and deprived households are highly concentrated in the eastern part of Slovakia. The regions can be divided into five clusters, while the Czech Capital Prague Region has a special position. It has the highest level of housing deprivation and the lowest level of durables/economic strain deprivation.

Key words: Poverty, Relative material deprivation, Czech Republic, Slovakia, EU SILC.

JEL: I32, I33, R23.

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Individual well-being can be assessed using several concepts (which are usually based on welfarist or non-welfarist approaches) (Jean-Yves Duclos and Araar Abdelkrim 2006). The paper focuses on the deprivation concept as one of the non-welfarist approaches to individual well-being measurement.

The aim of this paper is to propose a simple measure of relative material deprivation based on the Human Poverty Index (United Nations Development Programme (UNDP) 1997), which should serve as a proxy for the multidimensional deprivation level and as an alternative indicator of relative material deprivation based on the multidimensional approach. As the regional disparities in both countries are significant, the paper compares the levels of material deprivation in the two countries and their regions. Further it classifies the regions into clusters; the classification is based on hierarchical clustering.

1. A Note on the Economic History of the Czech and Slovak Republics

Before 1993 Slovakia and the Czech Republic were parts of the common Czechoslovakia (Czech and Slovak Federal Republic between 1989 and 1992). When Czechoslovakia was created in 1918, the differences among its historical regions of Bohe-

mia, Moravia, Silesia, Slovakia and Carpathian Ruthenia were substantial. After 1948 (when Czechoslovakia was ruled by the Communist Party) the government adopted policies aimed at alleviating the differences among people and assuring the communist principle of equality. As a result of this, Czechoslovakia belonged to the countries with the highest level of equality and reduced regional disparities at the end of the 1980s. The years 1971–1975 were economically the most successful in the history of socialist Czechoslovakia. Later, in the 1980s, the average living standards leaped backward to the level of the early 1960s (Otto Ulc 1984). The side effects of the policies had negative impacts on the efficiency of the economy and deformed the economic environment. After the transition the suppressed disparities accelerated rapidly (Dušan Sloboda 2006). The Slovak GDP per capita reached around three-quarters of the Czech GDP in 1992. After the split of Czechoslovakia, the Slovak economic policy was adjusted to the changed conditions by declining real wages and depreciation of the Slovak national currency. As a consequence the Slovak unit labour costs became the lowest among the Central European countries (Ruzena Vintrova 2008; Renata Vokorokosova 2010). Taking "advantage" of the low unit labour costs and adopting economic reforms after the EU accession had positive impacts on the real economy (Ivan Okali et al. 2009; Magdalena Frenakova, Vladimir Gazda, and Jana Jasovska 2010) and the Slovak GDP per capita reached 89% of the Czech GDP per capita in 2009. The low wages in Slovakia are one of the main factors of the high level of poverty in Slovakia in comparison with the Czech Republic (Iveta Pauhofova and Michal Palenik 2005; Jitka Bartosova 2009; Lubica Sipkova and Juraj Sipko 2010).

The poverty phenomenon began to be publicly discussed in the former Czechoslovakia after November 1989. Before 1989 (the communist era) accepting the existence of poverty was contrary to the communist ideological principle of equality (Viera Labudova, Maria Vojtkova, and Bohdan Linda 2010). Poverty was hidden, and socio-economic research on it was even prohibited (Jiri Vecernik 1991). On the other hand the socialist regime prevented poverty from arising by several direct and indirect tools such as redistribution mechanisms, price subventions and regulations, wage interventions, etc. (Petr Mares 1999).

The term "poverty" was substituted by "restricted consumption capability" in poverty analyses before 1989. Two distinct poverty lines were used (Miroslav Hirsl 1988): 1. *The social minimum level* defined as the ability to make meet all the needs that are necessary for creating a living standard common in the socialist society at minimal expense (determined as 56% of the average income for a consumption unit); 2. *The subsistence minimum level* defined as the ability to meet the basic needs of people working in the very lowest positions (determined as 42% of the average income for a consumption unit). In 1990 the Commission, to determine a living minimum level, recommended determining the poverty line in accordance with the European standard, i.e. as 50% of the mean income. At the end of 1990 the poverty line for an average family was set to approx. 44% of the national mean income (Hirsl 1992a, 1992b).

The first complex analyses of poverty in objective and subjective terms were conducted in Czechoslovakia in December 1990 and June 1991 within the survey

Economic Expectations and Attitudes of Czechoslovak Population with a sample size of about 1,700 respondents (Vecernik 1991). According to the survey there were about 4.4% of objectively poor (3.7% in the Czech part and 5.9% in the Slovak part) and about 39.2% of subjectively poor (33.9% in the Czech part and 49.7% in the Slovak part) in December 1990. While the level of objectively poor rose considerably in June 1991 to 10.5% (10.1% and 11.3% respectively), the level of subjective poverty decreased to 26.2% (23.7% and 30.6% respectively).

According to the latest official statistics (based on EU SILC 2009 data) the level of poverty in Slovakia and the Czech Republic is below the EU average. Population at risk of poverty or exclusion is defined as union of the following three subindicators: persons living in households with very low work intensity; persons at risk of poverty after social transfers; severely materially deprived persons (Eurostat 2011d[1]). The levels of poverty in Slovakia (19.6%) and the Czech Republic (14%) are even lower than those in the UK (22%), Italy (24.7%), Belgium (20.2%) and the EU average (23.1%). Using the monetary approach (the poverty line defined as 60% of the median equivalized disposable income after social transfers) the Czech Republic and Slovakia even belong to the countries with the lowest levels of at-risk-of-poverty rates (8.6% and 11% respectively) (Iveta Stankovicova 2010). According to official data the incidence of monetary poverty (in terms of the relative poverty concept) in both countries is not considered high. On the other hand the net income of 65% of the Slovak population is lower than 500 EUR monthly (estimations based on Social Security Agency individual microdata (see e.g. Pauhofova 2010; estimations based on Czech Security Agency individual data are not known). In the case of the "EU-wide threshold", which is the common poverty line for all EU countries (Alessio Fusco, Anne-Catherine Guio, and Eric Marlier 2010), the at-risk-of-poverty rate exceeds 45% in the Czech Republic and 85% in Slovakia, which is the highest rate (Bulgaria and Romania are excluded from this analysis). According to this "EU-wide income poverty line" Slovak households are ranked among the poorest in the EU. Similarly, the intensity of deprivation (defined as the mean number of "lacked" items) in both countries exceeds the EU-25 average and is higher in Slovakia than in the Czech Republic (Fusco, Guio, and Marlier 2010).

The subjective perception of poverty by households is another interesting concept. According to EU SILC 2008 microdata about 77% of Slovak and 67% of Czech households made ends meet with great difficulty, difficulty or some difficulty. When comparing the minimum monthly income required by households (i.e. a kind of their own individual subjective poverty line) with their actual income, the minimum required incomes of almost 70% of Slovak and 33% of Czech households exceeded the actual levels of their income (Tomas Zelinsky 2010d).

2. Relative Material Deprivation

Relative (material) deprivation is a concept used to assess the relative poverty of people/households based on comparing their positions with those of other people

[1] Eurostat. 2011d. *Eurostat Quality Profile: Population at Risk of Poverty or Exclusion.* Luxembourg: European Commission.

living in similar circumstances. According to Shlomo Yitzhaki (1979) income is the object of relative deprivation, and the income should be considered as an index of the individual's ability to consume commodities.

The concept of comparisons among individuals measuring themselves against a general goal was introduced by Robert K. Merton (1938) and the term *relative deprivation* was first used by Samuel A. Stouffer and his associates in 1949. Stouffer et al. (1949) studied the attitudes of American soldiers in relation to their general problems of personal adjustment in the institutionalized army life during the Second World War. The concept was later significantly developed by Walter G. Runciman (1966), who attempted to examine the relation between social inequality and relative deprivation. Runciman (1966) defines relative deprivation as follows: We can roughly say that [a person] is relatively deprived of X when (i) he does not have X, (ii) he sees some other person or persons, which may include himself at some previous or expected time, as having X, (iii) he wants X, and (iv) he sees it as feasible that he should have X.

Peter Townsend's (1979) *Poverty in the United Kingdom* is still considered as one of the most influential publications dealing with relative deprivation and was considered as one of the most exhaustive studies of the problem of poverty that time. Townsend (1979) shifted from money-metric indicators to non-income indicators. According to Townsend (1979, p. 31): Individuals, families and groups in the population can be said to be in poverty when they lack the resources to obtain the types of diet, participate in the activities and have the living conditions and amenities which are customary, or are at least widely encouraged or approved, in the societies to which they belong. Their resources are so seriously below those commanded by the average individual or family that they are, in effect, excluded from ordinary living patterns, customs and activities.

Townsend (1979) proposed a deprivation index that was an example of the distinction between fulfilment of basic needs, functioning achievement and capability (Duclor and Abdelkrim 2006), i.e. Amartya Sen's (1992) capability approach (Hatice K. Cakmak 2010).

The deprivation concept is also recognized by the European Union and indicators based on material deprivation are included in the social inclusion indicators portfolio (Anne-Catherine Guio 2009), while the indicator *severely materially deprived persons* is part of headline indicators of the Europe 2020 strategy. The *rate of severely materially deprived persons* is defined as share of population with an enforced lack of at least four out of nine material deprivation items in the "economic strain and durables" dimension. The nine items considered are: 1) arrears on mortgage or rent payments, utility bills, hire purchase instalments or other loan payments; 2) capacity to afford paying for one week's annual holiday away from home; 3) capacity to afford a meal with meat, chicken, fish (or vegetarian equivalent) every second day; 4) capacity to face unexpected financial expenses [set amount corresponding to the monthly national at-risk-of-poverty threshold of the previous year]; 5) household cannot afford a telephone (including mobile phone); 6) household cannot afford a colour TV; 7) household cannot afford a washing machine; 8) household cannot afford a car and 9) ability of the household to pay for keeping its home adequately

warm (Eurostat 2011c[2]). Several papers and studies analysing relative material deprivation in the European Union have been published. Richard Layte et al. (1999) analysed the relationship between household income and lifestyle deprivation and how it impacts on households' perceptions of economic strain using data on twelve countries from the first wave of the European Community Household Panel. According to their findings there are striking similarities across countries in the structuring of deprivation. Guio and Isabelle Engsted-Maquet (2006) compared monetary poverty with an alternative view based on material deprivation measures. The analyses are based on 2004 EU SILC microdata covering 13 EU countries and Norway. Their aim was to propose an approach to improve the material deprivation data that can be derived from the EU SILC survey. Whelan, Nolan, and Maitre (2008) used EU SILC microdata for 26 EU countries to examine the structure and distribution of material deprivation in the enlarged EU. They identified three distinct dimensions of material deprivation: 1. consumption, 2. household facilities and 3. neighbourhood environment. Paul Dickes, Fusco, and Marlier (2008) analysed data from the Eurobarometer survey on poverty and exclusion (European Commission 2008) carried out in 2007 in all 27 EU member states and aimed at assessing which items citizens of the EU consider to be necessary for them to live at an "acceptable" or "decent" standard of living in the country where they live. According to their results there is a high level of structural congruence between the national patterns of social needs as well as large consensus in the identification of socially defined necessities throughout the European Union. A consequence of their study is that it is legitimate to use the same set of items to measure deprivation in the 27 EU countries. Fusco, Guio, and Marlier (2010) analysed the relationship between income poverty and material deprivation in 25 European countries and identified the most important factors determining the risk of being income poor and/or materially deprived. According to their findings the intensity of deprivation is higher for persons below the poverty risk threshold than above it. Zelinsky (2010b) analysed relative material deprivation in Slovakia using EU SILC 2005–2008 microdata; the deprivation of low-income households from marginalized regions is further analysed (Zelinsky 2010a) and basic spatial distribution is outlined (Zelinsky 2010c).

3. Material Deprivation in the Czech Republic and Slovakia in the Past

Before 1989 there were no official publications analysing the level of material deprivation in Czechoslovakia. There have not been many such analyses even since 1989 (see e.g. Tomas Sirovatka and Mares 2006; Roman Dzambazovic 2007).

The census of 1991 can be considered as a useful source of data concerning material deprivation. However, in the case of relative material deprivation analysis, it can be used only partly. The census offers the possibility to analyse two dimensions of material deprivation of households: 1. in terms of necessities and 2. in terms of durables.

[2] Eurostat. 2011c. *Eurostat Quality Profile: Severely Materially Deprived Persons*. Luxembourg: European Commission.

In terms of necessary equipment dwellings with items such as a water system, public drainage system, WC washdown, bathroom or shower bath are generally considered as necessities so one should not expect any household to say it does not need them. Deprivation rates can then be simply estimated as (100% – *percentage of households/persons equipped with the given item*).

In terms of the equipment of households with durables, the main problem of the census is that it only gives data on dwellings (or persons in dwellings) equipped with durables. It does not distinguish between not possessing items because of the inability to afford them or because of other reasons (e.g. they do not need them). Hence, in the case of the census, it is not possible to eliminate the number of households not possessing items due to other reasons. Accepting the number of all households not possessing the items as deprived households would lead to biased interpretations.

Let us take a look at the equipment of Czech and Slovak households broken down by regions in 1991 and 2001 (the estimations are based on the official 1991 and 2001 censuses). There are some differences in the administrative divisions of the two countries into districts between the 1991 and the 2001 censuses (see e.g. Daniel Klimovsky 2008), so the comparison of the results is somewhat biased, hence the differences are not too big. In 1991 there were four regions in Slovakia: Western Slovakia, Central Slovakia, Eastern Slovakia and the capital city of Bratislava. Since 1996 there have been eight NUTS 3 regions (NUTS classification (*Nomenclature of territorial units for statistics)*, French: *Nomenclature des Unitées Territoriales Statistiques*) is a hierarchical system for dividing up the economic territory of the EU for the purpose of the collection, development and harmonization of EU regional statistics, socio-economic analyses of the regions and framing of EU regional policies: Bratislava (covering the capital city and a few other cities); Trnava, Trencin, Nitra (these three regions create *Western Slovakia*); Zilina and Banka Bystrica (*Central Slovakia*); and Presov and Kosice (*Eastern Slovakia*). As for the administrative division of the Czech Socialist Republic in 1991, there were seven regions, plus the capital city of Prague. Using the Czech census data provided by the Czech Statistical Office it was possible to rearrange the 1991 counties into the present NUTS2 regions easily, so it was much simpler to compare the results.

Regarding the water systems in the dwellings, over 90% of Slovak households in 1991 and almost 95% in 2001 were equipped with water systems, while the differences among the regions were negligible. The picture was quite similar in the Czech Republic with over 98% of equipped households in 1991 (and similarly in 2001). About 55% of Slovak dwellings were equipped with a public drainage system in 1991 and about 60% in 2001. The share of Czech dwellings increased from 68% in 1991 to 75% in 2001. In terms of toilets and shower baths the situation did not change significantly as 82% of Slovak and 91% of Czech dwellings were equipped with a toilet in 1991 (88% and 95% respectively in 2001); 89% of Slovak and 92% of Czech dwellings were equipped with a shower bath in 1991 (93% and 96% respectively in 2001).

As for durables, quite different types of items were surveyed in 1991 and 2001, which is why they cannot all be compared. In 1991 approx. 35% of Slovak and

46% of Czech households were equipped with an automatic washing machine and the share rose to 60% (in Slovakia) in 2001. While almost 50% of Slovak and over 60% of Czech households possessed a colour TV in 1991, in 2001 as many as 85% were colour TV holders in Slovakia. The situation is quite interesting from the viewpoint of car ownership. There was no significant change between the share of dwellings equipped with cars in Slovakia in 1991 and 2001 (approx. 40%). As for the Czech households, the share of car holders rose from 46% in 1991 to 51% in 2001. Fixed-line telephone possession increased from 31% (Slovakia) and 30% (Czech Republic) in 1991 to 70% and 68% in 2001 respectively.

It is obvious that the Czech households were in general equipped better than the Slovak ones. This means that, using household equipment as an indirect indicator of households' deprivation, the level of material deprivation was considerably higher in Slovakia.

4. Relative Material Deprivation in Regions of the Czech Republic and Slovakia According to EU SILC Microdata

The assessment of relative material deprivation in the Czech and Slovak Republics is based on EU SILC 2006–2008 microdata (Eurostat 2010[3], 2011a[4], 2011b[5]). EU SILC (*European Union Statistics on Income and Living Conditions*) is an instrument aiming at collecting timely and comparable cross-sectional and longitudinal multidimensional microdata on income, poverty, social exclusion and living conditions (The European Parliament and the Council of the European Union 2003).

Generally three subindices can be identified and they refer to the three dimensions of households' deprivation as described by Guio (2009) and Zelinsky (2010b):

P_1: *Economic strain* (arrears on mortgage or rent, utility bills or hire purchase; inability to afford one week's holiday away from home; inability to afford a meal with meat, chicken, fish or a vegetarian equivalent every second day; inability to face unexpected financial expenses; and inability to keep the home adequately warm);

P_2: *Durables* (enforced lack of a telephone; a colour TV; a computer; a washing machine; and a personal car);

P_3: *Housing/dwelling* (considering *internal conditions*: leaking roof, damp walls, floors or foundation, or rot in the window frames or floor; lack of a bath or shower in the dwelling; lack of an indoor flushing toilet for the sole use of the household; dwelling too dark; and *external conditions*: noise from neighbours or from the street; pollution, grime or other environmental problems; crime, violence or vandalism in the area).

Dimension 1 - Economic Strain

The level of deprivation in terms of economic strain is higher in Slovakia than in the Czech Republic. There are considerable differences among the Czech and Slovak regions in the inability to afford one week's annual holiday away from home. While

[3] Eurostat. 2010. *EUSILC UDB 2006 - version 4 of March 2010*. Luxembourg: European Commission.
[4] Eurostat. 2011a. *EUSILC UDB 2007 - version 6 of August 2011*. Luxembourg: European Commission.
[5] Eurostat. 2011b. *EUSILC UDB 2008 - version 3 of August 2011*. Luxembourg: European Commission.

the shares of deprived persons in the Slovak regions vary between 50% and 70% (except for the Bratislava region), there are only 30–40% of deprived persons in the Czech regions (except for the Capital Prague region). Further there are significant differences in households' inability to afford a meal with meat, chicken or fish (or a vegetarian equivalent) every second day. The share of deprived persons in the Slovak regions (20–50%) is compared with the share of deprived persons in the Czech regions (10–20%).

In terms of economic strain the eastern part of Slovakia (especially the Presov region) and the north-western part of the Czech Republic (especially the Karlovy Vary and Usti nad Labem regions) can be considered as the most deprived regions.

Further it is interesting to compare the situation in densely, intermediate and thinly populated areas. (*Densely populated areas* are groups of contiguous municipalities, each with a population density greater than 500 inhabitants per km² and a total population of at least 50,000 inhabitants. *Intermediate populated areas* are groups of contiguous municipalities, each with a population density greater than 100 inhabitants per km², not belonging to a densely populated area. The area must have a total population of at least 50,000 inhabitants or be adjacent to a densely populated area. *Thinly populated areas* are groups of contiguous local territorial units not classified as either densely populated or intermediate.) The following patterns are common to both countries: densely populated areas are associated with higher levels of deprivation in terms of arrears; thinly populated areas are associated with higher levels of deprivation in terms of the inability to afford one week's holiday and the inability to afford meat twice a week. As for the inability to face unexpected expenses and the inability to keep the home warm, these have not been steady over time.

Dimension 2 - Enforced Lack of Durables

In the case of certain durables there are again considerable differences in the level of persons' deprivation among the Czech and the Slovak regions. Also in this case the situation is worse in the Slovak regions. The share of persons lacking a computer decreased from 20–30% in 2006 to about 10–18% in 2008 in the Slovak regions. The situation was more favourable in the Czech regions with the share of deprived persons declining from 6–20% in 2006 to about 5–13% in 2008. A personal car is another durable that many persons are lacking. In the Slovak regions the share of deprived persons decreased from 20–30% in 2006 to about 15–25% in 2008. The situation is quite different in the Czech regions: it is rather steady and the share of deprived persons in the Czech regions is between 6% and 22% during the whole analysed period.

As for the association between the level of deprivation and the degree of urbanization, there is a clear pattern indicating a higher level of deprivation in thinly populated areas in the Slovak regions, while this is not true for the Czech regions. Regarding the enforced lack of a car the situation is quite similar in the two countries, with higher levels of deprivation in the densely populated regions.

Dimension 3 - Housing/Dwelling

So far in almost all cases the Czech regions were favoured in comparison with the Slovak ones. Housing/dwelling is the only dimension indicating a better situation for the Slovak regions in some cases. The most significant differences between the Czech and the Slovak regions are perceived in terms of leaking roofs and crime in the area. In both cases the Slovak regions are better off. While only 5–10% of persons from Slovak regions perceive deprivation in terms of a leaking roof, 10–25% of persons from Czech regions perceive the same type of deprivation. As for crime, violence or vandalism in the area, there are 5–18% of deprived persons in the Slovak regions, while the share of deprived persons in the Czech regions lies between 5% and 28%. Regarding other items in the dimension the situation is quite similar for the two countries. It is obvious that the higher level of deprivation in terms of noise from the street/neighbours, pollution and crime is associated with densely populated areas and this statement is also supported by the results.

5. Aggregate Index of Relative Material Deprivation

In order to assess relative material deprivation using a simple multidimensional measure we adopt and adjust the approach proposed by the UNDP for the *Human poverty index* construction (UNDP 1997):

Let $\overline{w}_i > 0$ be the weight on i^{th} item; $D_i \in [0; 1]$ the share of deprived households in respect to the given item; and parameter $\beta > 1$. The generalized mean subindex $P_j(\beta)$ for the j^{th} dimension ($j = 1, 2, 3$) is defined as

$$P_j(\beta) = \left(\frac{\sum_{i=1}^{n} \overline{w}_i D_i^{\beta}}{\sum_{i=1}^{n} \overline{w}_i} \right)^{\frac{1}{\beta}} \tag{1}$$

The elasticity of substitution between any two items of $P_j(\beta)$ is constant and given by $\frac{1}{\beta - 1}$.

As proposed by UNDP (1997) for calculating the subindices, $\beta = 3$ was chosen, which gives an elasticity of substitution of 1/2 and places greater weight on those dimensions in which deprivation is larger (see the justification in UNDP 1997, pp. 117–121).

The *Aggregate Relative Material Deprivation Index* is then calculated as the arithmetic mean of the three subindices, i.e.

$$\overline{P} = \frac{P_1 + P_2 + P_3}{3} \tag{2}$$

There are several approaches to weighting the items, the most commonly used being based on the proportion of people having the given item over the whole population or assessing people's perceptions of the necessity of a certain item (Meghnad Desai and Anup Shah 1988; Guio 2009). In our case the weighting of items is based on the results of *Special Eurobarometer 279/Wave 67.1* (European Commission 2007) assessing respondents' perceptions of each item's necessity (the given items are considered "absolutely necessary, no one should have to do without").

As there are differences in the perceptions of items' importance between Czechs and Slovaks, individual weights w_{ij} of item i in country j have to be calculated:

$$w_{ij} = \frac{Imp_{ij}}{\sum_{i=1}^{n} Imp_{ij}} \tag{3}$$

where Imp_{ij} is the perceived importance of item i (i.e. the proportion of people considering item i as "absolutely necessary") in country j (j = 1 for the Czech Republic and j = 2 for the Slovak Republic).

In order to assure comparability across countries the resulting weights $\overline{w}_i$ are calculated as arithmetic averages of individual weights:

$$\overline{w}_i = \frac{w_{i1} + w_{i2}}{2} \tag{4}$$

Table 1 gives the proportions of the population considering the items as absolutely necessary, i.e. their importance together with their individual and resulting weights.

Table 1 Weights of Items in Deprivation Index

Ability of household to:									
Keep home adequately warm		Pay utility bills, rent or mortgage payments, repay loans on time		Cope with unexpected financial expenses		Afford chicken, fish, meat at least every 2 days		Afford paying for one week holiday away from home	
Imp.	w_i	Imp.	w_i	Imp.	w_i	Imp.	w_i	Imp.	w_i
50 %	0.30	67 %	0.40	20 %	0.12	22 %	0.13	10 %	0.06
59 %	0.25	72 %	0.31	44 %	0.19	38 %	0.16	20 %	0.09
0.2745		***0.3527***		***0.1536***		***0.1466***		***0.0725***	

Ability of household to afford a:									
Washing machine		Colour TV		Fixed or mobile phone		Personal car		Computer	
Imp.	w_i	Imp.	w_i	Imp.	w_i	Imp.	w_i	Imp.	w_i
59 %	0.48	23 %	0.19	20 %	0.16	13 %	0.10	9 %	0.07
68 %	0.41	34 %	0.20	25 %	0.15	23 %	0.14	17 %	0.10
0.4415		***0.1945***		***0.1555***		***0.1213***		***0.0872***	

For a household it is absolutely necessary to have:													
An indoor flushing toilet		No leaking roof		Bath or shower		Not too dark housing		Not too much noise		No crime in area		No pollution	
Imp.	w_i	Imp.	w_i	Imp.	w_i	Imp.	w_i	Imp.	w_i	Imp.	w_i	Imp.	w_i
70 %	0.22	64 %	0.20	65 %	0.20	34 %	0.11	20 %	0.06	32 %	0.10	34 %	0.11
69 %	0.17	70 %	0.17	66 %	0.16	51 %	0.13	37 %	0.09	57 %	0.14	52 %	0.13
0.1955		***0.1874***		***0.1840***		***0.1167***		***0.0774***		***0.1211***		***0.1180***	

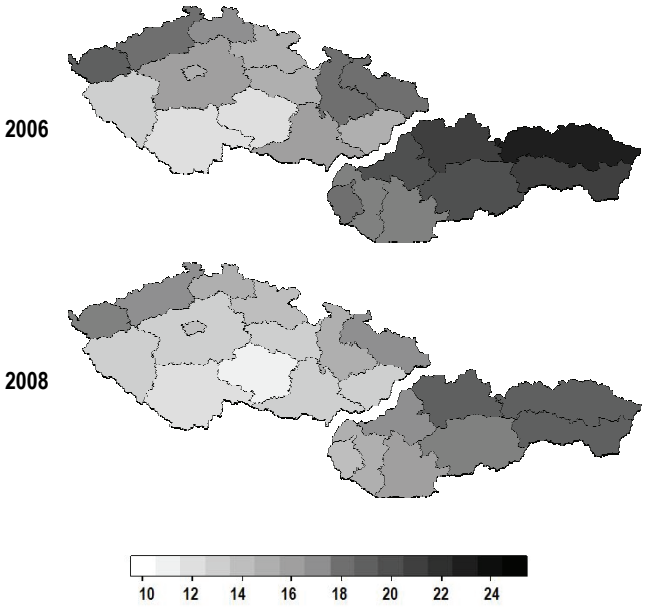
Notes: Imp. – Importance.

Source: Own calculations based on Special Eurobarometer 279 results.

6. Results and Discussion

Ever since the common republic, there have been differences between the Czech and the Slovak parts of the country with higher levels of poverty in Slovakia. The situation is quite similar nowadays.

The values of the subindices (Tables A1 and A2 in the Appendix) are in the range [0; 100], with higher values indicating higher levels of relative deprivation and hence higher levels of poverty. As one would expect, the overall deprivation is higher in Slovakia than in the Czech Republic. While the Aggregate Relative Material Deprivation Index had a value of 15.8 in the Czech Republic in 2006, the value for Slovakia was 20.4. Until 2008 the value of the index decreased to 13.9 in the Czech Republic and to 17.4 in Slovakia.



Note: Moran's I: CZ_{2006} = 0.18; CZ_{2008} = 0.27; SK_{2006} = 0.55**; SK_{2008} = 0.66**; **significant at the 0.01 level.

Source: Own maps based on own estimations, using map layers by © EuroGeographics for the administrative boundaries.

Figure 1 Index of Deprivation in the Czech and Slovak Regions in 2006/2008

The economic strain dimension has the most considerable impact on the overall deprivation in both countries. As for the durables dimension, the values of the indices in the Slovak regions are approximately twice as high as those in the Czech regions. On the other hand, as one would assume, the only dimension with slightly better values for the Slovak regions is the housing/dwelling dimension.

Comparing the spatial distribution of the deprivation indices across the Czech and Slovak regions (see Figure 1) one can assume that the deprivation is concentrated in the north-eastern part of Slovakia, while the distribution of deprivation in the Czech regions is rather random. Such an assumption is also supported by Moran's I coefficient of spatial autocorrelation with high values in Slovakia (0.55 and 0.66) indicating significant positive spatial autocorrelation and low values in the Czech Republic (0.18 and 0.27) indicating no spatial autocorrelation.

Table 2 Correlation Coefficients (and their p-values) among Monetary Poverty Rate and Deprivation Indices

	Pearson			Spearman		
	2006	**2007**	**2008**	**2006**	**2007**	**2008**
Economic strain	**0.555****	**0.551****	**0.674*****	**0.550****	**0.550****	**0.697*****
	(0.007)	*(0.008)*	*(0.001)*	*(0.008)*	*(0.008)*	*(0.000)*
Durables	**0.376**.	**0.383**.	**0.547****	**0.386**.	**0.396**.	**0.561****
	(0.084)	*(0.079)*	*(0.008)*	*(0.076)*	*(0.068)*	*(0.007)*
Housing	**0.142**	**0.072**	**-0.153**	**0.215**	**0.136**	**-0.04**
	(0.528)	*(0.752)*	*(0.497)*	*(0.337)*	*(0.546)*	*(0.861)*
Aggregate deprivation	**0.577****	**0.513***	**0.584****	**0.566****	**0.528***	**0.59****
	(0.005)	*(0.015)*	*(0.004)*	*(0.006)*	*(0.011)*	*(0.004)*

Notes: Significance codes (2-tailed): 0 *** 0.001 ** 0.01 * 0.05 . 0.1.

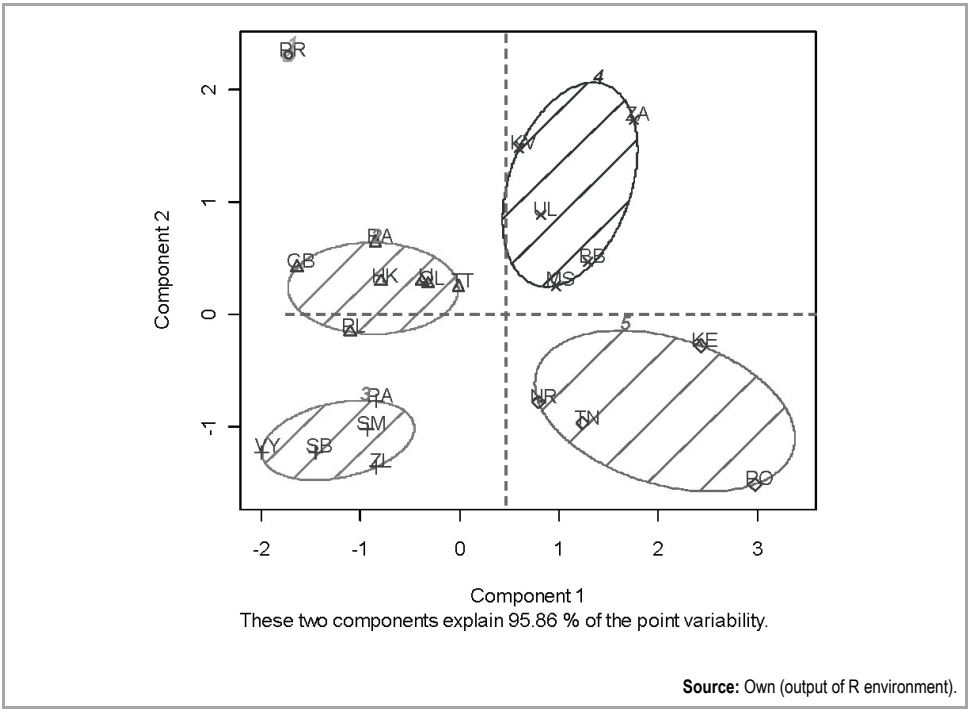
Source: Own estimations based on EU SILC microdata.

As for the distribution of the "durables" dimension of relative material deprivation across densely, intermediate and sparsely populated areas, higher deprivation is associated with densely populated areas. This situation can be explained basically by the inability of households to afford a car, i.e. a relatively high share of persons from densely populated areas (cities) would like to own a car, but cannot afford one. On the other hand persons from sparsely populated areas are more often dependent on cars when travelling to work/school (e.g. when the public transport is not satisfactory). A similar pattern is observed for the "housing" dimension. In this case three main factors account for the higher levels of deprivation in densely populated areas: the perceptions of pollution, noise and crime. As for the "economic strain" dimension differences among densely, intermediate and thinly populated areas are rather neglectable in the Czech Republic, but significant in Slovakia (with higher levels of

deprivation in thinly populated areas). This can be explained by the relatively higher income level in the Czech Republic, while there are still many persons (especially from thinly populated areas) in Slovakia who cannot afford one week's holiday away from home.

We further examine the relationship among the at-risk-of-poverty rate and the deprivations indices (Table 2). It is obvious that monetary poverty is significantly positively correlated with deprivation measures, i.e. material deprivation is positively associated with income poverty. There is only one exception – the *housing dimension* – that is not correlated with monetary poverty, i.e. there are many persons above the income poverty line facing material deprivation and many persons under the income poverty line not facing material deprivation (in terms of the housing dimension).

The last analysis is focused on classifying the Czech and Slovak regions into similar clusters. As the economic strain and durables dimensions are significantly correlated, factor analysis scores are used as input to the cluster analysis. The regions are classified using hierarchical clustering in R environment (R Development Core Team 2011). Five clusters are identified (see Figure 2).



Source: Own (output of R environment).

Figure 2 Division of Regions into Clusters by Housing (Component 2) and Strain/Durables Dimension (Component 1)

Cluster #1 (*CZ-Capital Prague*): the region with the highest level of housing deprivation and the lowest level of strain/durables deprivation. Prague has a special position, as it can be considered the most economically developed region (exceeding 170% of the EU average in PPS per inhabitant), with the highest degree of urbaniza-

tion (almost 2,500 people per sq km). As was the case of densely populated areas, persons living in Prague face a low level of the economic strain or durables types of deprivation, but perceive a relatively high level of crime, pollution or noise, which is a kind of external housing deprivation.

Cluster #2 (*CZ-Central Bohemia*, *PL-Plzen*, *HK-Hradec Kralove*, *CZ-Liberec*, *CZ-Olomouc*, *SK-Bratislava*, *SK-Trnava*): this cluster consists of "average" regions with an average level of deprivation. While the two Slovak regions included in this cluster can be characterized as regions with a low unemployment rate, high GDP, high population density and low level of income poverty, there are significant differences among the Czech regions in this cluster. The at-risk-of-poverty rates of most of the Czech regions in cluster #2 are relatively low (the Olomouc region is an exception – with the highest overall at-risk-of-poverty rate).

Cluster #3 (*CZ-South Bohemia*, *CZ-Pardubice*, *CZ-Vysocina*, *CZ-South Moravia*, *CZ-Zlin*): this cluster includes Czech regions located in the southern and eastern parts of the country. Persons in cluster #3 regions perceive the lowest level of deprivation. The regions in cluster #3 are characterized by a relatively low level of unemployment (with the exception of the South Moravia region).

Cluster #4 (*CZ-Karlovy Vary*, *CZ-Usti nad Labem*, *CZ-Moravia-Silesia*, *SK-Zilina*, *SK-Banska Bystrica*): regions with a higher level of housing deprivation and a higher level of strain/durables deprivation. The Czech regions in cluster #4 have high unemployment rates and high at-risk-of-poverty rates. The Slovak regions are quite different: Banka Bystrica Region has the highest unemployment rate, the second lowest GDP, the lowest population density and the second highest at-risk-of-poverty rate; Zilina accounts for the average values of these variables.

Cluster #5 (*SK-Trencin*, *SK-Nitra*, *SK-Presov*, *SK-Kosice*): regions with a lower level of housing deprivation and the highest level of strain/durables deprivation. Most of the people from regions in cluster #5 live in areas with relatively low population density. As already discussed, such areas are characterized by a low level of housing deprivation and a high level of economic strain and durables deprivation. It is obvious from Figure 2 that the Presov region (PO) has the lowest level of housing deprivation and the highest level of economic strain/durables deprivation. The Presov region has the lowest level of GDP per capita (reaching 42% of the EU average in PPS per inhabitant). The Presov and Kosice regions belong to Eastern Slovakia, which is also characterized by a relatively high level of unemployment and it is estimated that the highest share of the Roma population live in this part of the country. Romas are the most vulnerable group in Slovakia and face the highest risk of poverty or social exclusion (Zelinsky 2011).

It is obvious that the differences among the Czech and Slovak regions are considerable. Since the creation of Czechoslovakia in 1918, Slovakia lagged behind the Czech lands. While the Czech part of the country was the most developed part of the former Austria-Hungary, Slovakia even underwent deindustrialization (which was evident especially in the eastern part of Slovakia). In 1949 the industrialization of Slovakia became the main goal of the post-war economic policy of Czechoslovakia, which resulted in rapid industrialization of Slovakia. A further long-term regional economic policy was aimed at the alleviation of the discrepancies between the Czech

and the Slovak parts. The adopted policies resulted in the achievement of economic equalization between the two parts of the country, but on the other hand several regional problems arose (underdeveloped infrastructure, urban–industrial overconcentration in particular regions, etc.) (Petr Pavlinek 2005). After the rapid programme of economic transformation the total industrial production decreased considerably in both countries in 1991 (Vintrova 2008). Unemployment grew more rapidly in Slovakia than in the Czech Republic with higher values in the east, and the unemployment rates in some Slovak districts exceeded 20% (Pavlinek 2005). It is obvious that Slovakia has been negatively affected by the economic transition more seriously than the Czech Republic.

7. Conclusion

Even today, poverty is a serious socio-economic problem in developing as well as in developed economies. Taking into account the negative impacts of the current crises (Kosta Josifidis, Alpar Lošonc, and Novica Supić 2010), the situation of the most vulnerable low-income people can even worsen in developing as well as developed economies. According to the latest estimates approximately 80 million citizens of the European Union can be considered poor. The EU has a commitment to solidarity, social justice and greater inclusion and one of the goals is to alleviate poverty, so the European Commission designated the year 2010 the *European Year for Combating Poverty and Social Exclusion*.

The Czech Republic and Slovakia joined the European Union in 2004 and were perceived as poorer countries in comparison with the EU-15 countries. Before 1993 both countries were parts of the common Czechoslovakia, which was a communist country until 1989. Even during the common history of the countries, the Slovak part was always poorer than the Czech part and the differences among the regions were large.

The article first describes the level of Czech and Slovak households' equipment based on 1991 and 2001 census data. The estimation of the relative material deprivation levels in the Czech and Slovak regions is based on EU SILC microdata. As there are many items that should be considered when analysing material deprivation, an aggregate index of relative material deprivation is proposed. The construction of the index is based on the UNDP Human Poverty Index and three dimensions are assessed: economic strain, enforced lack of durables and housing/dwelling. The results indicate that there are significant differences in the relative material deprivation among the regions. The relative material deprivation is highly concentrated in the eastern part of Slovakia; on the other hand no such clear pattern is observed in the Czech Republic.

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Appendix

Table A1 Deprivation Indices – Czech Regions

	P_1: Economic strain			P_2: Durables			P_3: Housing			$\bar{P}$		
	2006	2007	2008	2006	2007	2008	2006	2007	*2008*	**2006**	**2007**	**2008**
CZ	24.4	22.9	23.5	7.7	6.6	5.9	15.2	12.7	12.2	**15.8**	**14.1**	**13.9**
PR	19.0	19.6	19.1	7.7	4.6	4.5	18.5	17.2	17.8	**15.1**	**13.8**	**13.8**
CB	27.5	21.4	21.4	6.9	4.4	3.4	13.9	11.9	13.6	**16.1**	**12.6**	**12.8**
SB	19.1	18.7	22.1	5.1	4.4	3.7	12.2	9.7	9.7	**12.1**	**10.9**	**11.8**
PL	23.0	18.9	23.1	3.7	4.6	4.6	13.7	10.4	12.2	**13.4**	**11.3**	**13.3**
KV	29.9	28.2	28.6	10.9	8.7	8.5	18.1	16.6	16.0	**19.6**	**17.8**	**17.7**
UL	28.9	28.5	27.3	8.9	11.1	10.2	20.4	16.6	14.3	**19.4**	**18.7**	**17.3**
LI	25.5	24.7	23.7	9.1	6.6	7.3	15.3	14.2	13.0	**16.6**	**15.2**	**14.7**
HK	21.7	22.4	23.0	7.0	6.8	6.0	15.1	14.5	13.1	**14.6**	**14.6**	**14.1**
PA	22.6	22.9	23.7	6.8	7.7	5.3	14.5	12.2	10.7	**14.6**	**14.3**	**13.2**
VY	19.0	18.1	19.5	4.5	3.6	3.0	11.9	9.5	9.6	**11.8**	**10.4**	**10.7**
SM	24.2	22.6	23.4	7.2	5.4	5.1	16.4	12.4	10.1	**15.9**	**13.5**	**12.9**
OL	29.4	25.8	25.1	9.9	9.4	6.7	16.5	15.3	13.1	**18.6**	**16.8**	**15.0**
ZL	23.4	19.5	22.9	5.9	5.7	5.8	15.7	10.5	9.2	**15.0**	**11.9**	**12.6**
MS	29.4	29.3	29.3	12.5	10.6	9.6	15.8	13.7	13.0	**19.2**	**17.9**	**17.3**
DP	24.1	22.9	22.5	9.6	7.4	6.9	17.9	16.1	16.6	**17.2**	**15.5**	**15.3**
IP	25.1	23.4	24.0	8.3	7.2	6.4	15.0	12.0	11.1	**16.1**	**14.2**	**13.9**
TP	24.6	22.7	24.3	6.1	5.8	4.9	14.3	11.4	10.6	**15.0**	**13.3**	**13.2**

Notes: PR: Prague Region, CB: Central Bohemian Region, SB: South Bohemian Region; PL: Plzen Region; KV: Karlovy Vary Region; UL: Usti nad Labem Region; LI: Liberec Region; HK: Hradec Kralove Region; PA: Pardubice Region; VY: Vysocina Region; SM: South Moravian Region; OL: Olomouc Region; ZL: Zlin Region; MS: Moravian-Silesian Region; DP: Densely populated areas; IP: Intermediate populated areas; TP: Thinly populated areas.

Source: Own estimations based on Czech 2006 - 2008 EU SILC microdata.

Table A1 Deprivation Indices – Slovak Regions

	P_1: Economic strain			P_2: Durables			P_3: Housing			$\bar{P}$		
	2006	2007	2008	2006	2007	2008	2006	2007	*2008*	**2006**	**2007**	**2008**
SK	34.2	30.7	29.7	15.2	12.7	10.7	11.7	11.1	11.9	**20.4**	**18.1**	**17.4**
BA	27.3	22.3	19.7	14.7	10.3	7.8	14.3	15.3	13.5	**18.8**	**16.0**	**13.7**
TT	30.4	24.3	23.0	12.4	8.7	9.3	11.4	11.4	12.6	**18.0**	**14.8**	**14.9**
TN	36.9	30.7	28.8	15.5	13.1	11.0	9.5	9.0	9.9	**20.6**	**17.6**	**16.5**
NR	33.4	30.1	29.8	11.5	11.1	8.5	9.8	9.2	10.7	**18.2**	**16.8**	**16.3**
ZA	31.4	27.4	29.9	16.4	14.2	12.6	16.6	13.3	16.2	**21.5**	**18.3**	**19.6**
BB	34.1	30.1	30.4	15.3	12.4	10.3	12.4	11.6	13.5	**20.6**	**18.1**	**18.1**
PO	41.6	42.5	38.6	19.0	15.3	12.3	9.8	10.3	9.1	**23.5**	**22.7**	**20.0**
KE	37.4	34.7	34.3	16.3	14.8	12.7	11.5	10.1	11.7	**21.7**	**19.9**	**19.6**
DP	30.5	26.7	25.0	15.3	12.6	11.0	15.2	15.7	15.8	**20.4**	**18.3**	**17.3**
IP	35.5	32.1	28.5	15.8	13.0	10.4	10.8	9.1	10.9	**20.7**	**18.0**	**16.6**
TP	35.8	32.6	33.9	14.1	12.4	10.8	11.3	10.6	10.6	**20.4**	**18.5**	**18.4**

Notes: SK: Slovakia; BA: Bratislava Region; TT: Trnava Region; TN: Trencin Region; NR: Nitra Region; ZA: Zilina Region: BB: Banska Bystrica Region; PO: Presov Region; KE: Kosice Region; DP: Densely populated areas; IP: Intermediate populated areas; TP: Thinly populated areas.

Source: Own estimations based on Slovak 2006 - 2008 EU SILC microdata.