

Determinants of Poverty in the Northern Hungarian Region

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The paper focuses on the Northern Hungarian region, one of the poorest regions in Hungary. This region has faced severe economic and social challenges since 1990. In spite of its natural and environmental potentials, its performance has been very poor both in terms of economic and social progress. It is one of the most backward regions in Hungary (based on GDP per capita). Eurostat reports this region is among the poorest twenty regions within the European Union (based on GDP per capita PPP, it is the 259th among the 271 regions of the European Union). Currently real struggle has been fought for economic competitiveness and for a better quality of life.

The paper examines how income poverty was affected by different social and economic factors in the sub regions of the Northern Hungarian region. The indicator of monetary poverty is the average per person income level. As for the social and economic determinants of monetary poverty, average education attainment, unemployment rate, average size of dwellings, the rate of the elderly (60+) population and the average number of children in families are examined.

The analysis is carried out with the methods of multiple correlation and regression analysis, using the databases of the Census 2001 and 2011. The results therefore can highlight the changes in the determinants of monetary poverty over time, which changes can partly be due to the global economic crisis. The analysis is carried out for the region and for one of the counties (Borsod-Abaúj-Zemplén) of the region as well to reveal the potential territorial differences if any.

Introduction

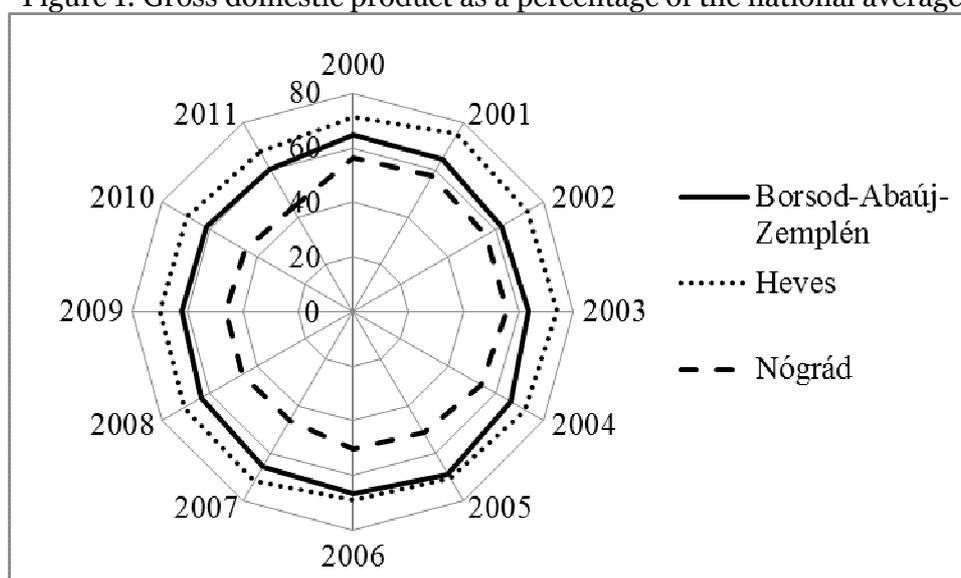
Even though information about the social effects of the global economic crisis started in 2008 is limited, it is sure that economic recession, the decrease of real salary levels and the significant decrease of the number of workplaces have rendered the life of many people more difficult. Changes in economic and social roles have accelerated, which affects the individuals' behaviour. Most of the individuals are able to adapt themselves to the changing roles, but there are some who cannot either because of their inherited cultural norms or because of their lifestyle. They are the ones who are most endangered by poverty and social exclusion.

The study examines the main determinants of poverty, i.e. the factors that contribute to impoverishment. The paper examines how income poverty (measured with average per person income level) was affected by different social and economic factors in the sub-regions of the Northern Hungarian region. As for the social and economic determinants of income poverty, average education attainment, unemployment rate, average size of dwellings, the rate of the elderly (60+) population, the average number of children in families and the rate of the Roma population are examined.

The study examines Northern Hungary, one of the most backward regions in Hungary (based on GDP per capita). In spite of its natural and environmental potentials, its performance has been very poor both in terms of economic and social progress. Eurostat reports this region is among the poorest twenty regions within the European Union (based on GDP per capita PPP, it is the 259th among the 271 regions of the European Union). The lag of the counties of the region from the national average economic performance is reflected in Figure 1.

The analysis is carried out with the methods of multiple correlation and regression analysis, using the databases of the Census 2001 and 2011. The results therefore can highlight the changes in the determinants of income poverty over time, which can partly be due to the global economic crisis. The analysis is carried out for the region and for a county Borsod-Abaúj-Zemplén of the region as well to reveal the potential territorial differences if any.

Figure 1: Gross domestic product as a percentage of the national average



Source: own compilation based on the database of the Hungarian Central Statistical Office

Poverty and its determinants

There is no exclusive definition for poverty. According to the most general definition, one is considered to be poor if (s)he does not have the minimal amount of money necessary to make ends meet, that is his/her income does not exceed a minimal level (Bokor, 1987).

Four main conceptions of poverty are distinguished in the poverty literature (refer to Figure 2). Absolute concepts of poverty assume that minimum material needs can be defined regardless of space and time. Those who are not able to satisfy these needs are considered to be poor. The relative conceptions define poverty as being below some relative poverty threshold. People can be considered to be poor if they fall behind some average wealth level of the population to a certain extent (for example 50 or 60 percent of mean or median income level). The other approach using the relative poverty concept defines poverty line as an income level below which a certain part (one tenth or one fifth) of the population lives (Hegedűs & Monostori, 2005).

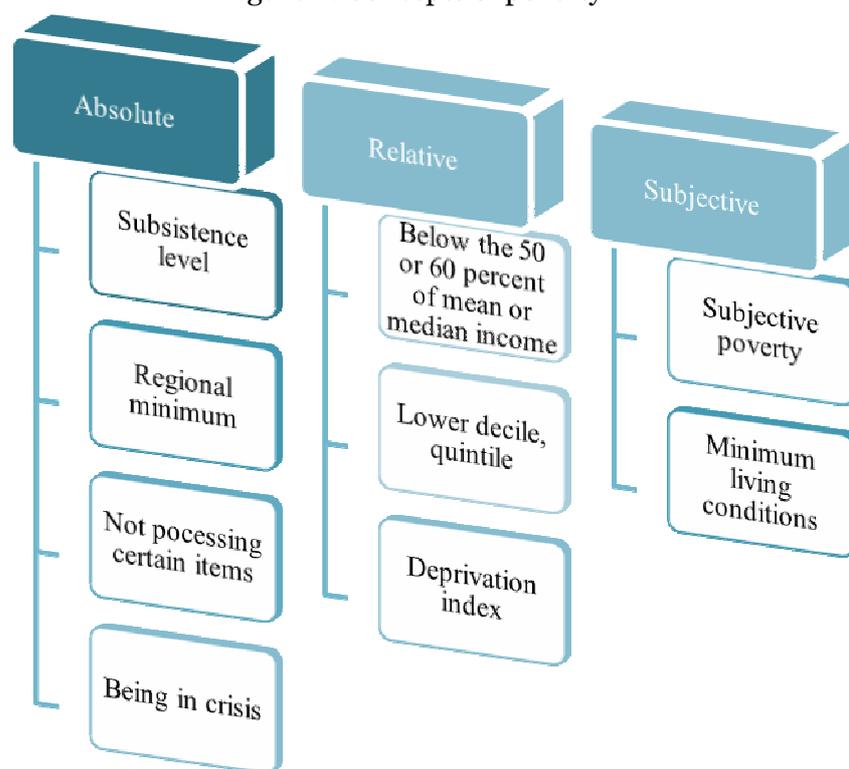
Subjective well-being can be reflected by the so-called subjective poverty concept. This concept was elaborated by two research groups. *Van Praag* (1971) worked out

the Income Evaluation Question (IEQ) to collect data on subjective well-being. Deleeck and his staff defined CSP (Subjective Poverty Line). Subjective poverty concept can be used in two ways. On the one hand, poverty can be defined by examining who people consider to be poor. It can also be defined by collecting peoples' beliefs about their own position in a system of inequalities (Spéder, 2002).

Besides its monetary definition, there are multidimensional concepts of poverty as well. In this sense, deprived is the person who is in an unfavourable position from several aspects, so handicaps are accumulated. Accumulated poverty and social exclusion do not, however, refer to the same phenomenon. In the case of accumulated poverty, emphasis is put on the output, namely on the deprivation from certain goods and services. Exclusion, however, primarily focuses on the process leading to poverty (Havasi, 2002). Complex view of poverty is important because deprivation is more widespread if more dimensions are taken into consideration (Bokor, 1987). Some of the approaches of the multidimensional poverty concepts are the following.

- a) The Swedish “resource-based” approach says that the analysis of social exclusion is possible based on four dimensions:
- demographic aspects (gender, age, family type);
 - social classes (profession, sectors);
 - socially endangered groups (entrants, long term unemployed, people with low qualification);
 - regional analysis (Bukodi, 2001).

Figure 2: Concepts of poverty



Source: own compilation based on Spéder (2002:53)

- b) The approach of living standard, however, focuses not only on the objective measures of welfare, but also on its subjective components. In this sense, deprivation means that the objective and the subjective welfare of the

individual are inappropriate at the same time (Bukodi, 2001). Indices of the approach of living standard are included in the German system of social indicators.¹

- c) In 1954, the Statistical Commission of the UN proposed to divide the social phenomena related to living conditions into their components. The English system of social indices² was elaborated taking them into consideration.
- d) *Gábos and Szivós (2002)* found the objective determinants of poverty³ in their research. They concluded that labour market position, education attainment, regional characteristics and demographic factors can influence the risk of monetary poverty.

Methodology

Research works on poverty list age, educational attainment, unemployment, ethnic origin and housing as risk factors / determinants of poverty (*Gábos & Szivós, 2002*). Based on them, I include the following explanatory variables into my analysis:

- average education attainment (average number of years completed at school);
- the rate of the people older than 60 (%) (as a variable expressing the age structure of the population);
- average number of children in 100 families;
- average size of dwellings in m² (expressing the effect of housing);
- unemployment rate (%);
- rate of the Roma minority (as a variable for ethnic minority).

To test whether these indices can affect monetary poverty significantly, multiple correlation and regression analysis is applied. The backward method is used in SPSS 19.0 to find the optimum regression analysis. A 0.05 significance level is used in the calculations.

Sub regional data are used for the analysis, which are derived from Census 2001 and 2011. The analysis is carried out for the Northern Hungarian region (which includes 28 sub regions) and for Borsod-Abaúj-Zemplén county (including 15 sub regions). The regression analysis cannot be carried out for the two other counties because of the inadequate number of cases (7 sub regions in Heves county and six sub regions in Nógrád county).

The regression analysis for 2001 was carried out in *Siposné Nándori (2009)*. In that analysis, rate of the Roma minority was not included, but all the other predictors listed above were included.

¹ The indices are the following: population, socio-economic status, labour market position, income level, income distribution, supply and consumption of goods and services, transport, housing, health status, health care, education system, education attainment, social connections, environmental protection, public safety, criminality, leisure time, media consumption.

² Indicators proposed by the UN are the following: population, households and families, education attainment, labour market, financial well-being, household expenses, health, social protection, public safety, housing, environment, transport, lifestyle.

³ In their model, they included the following indices first: age, education attainment, unemployment, inactivity, ethnic origin of the head of the household, housing, number of persons in the household.

Regression analysis includes the following assumptions:

- 1.) The error term follows a normal distribution. This assumption is met by the OLS method that is being used.
- 2.) There is no autocorrelation in the error term. The analysis is carried out on cross-sectional data sets, so autocorrelation is not a problem in these cases.
- 3.) The variance of the error is constant across observations. Kolmogorov-Smirnov test (Table 1) is used to test homoscedasticity. Based on the results, I fail to reject the hypothesis that the variance of the error is constant across observations.

Table 1: One Sample Kolmogorov-Smirnov test

	<i>Northern Hungary</i>		<i>Borsod-Abaúj-Zemplén county</i>	
	<i>2001</i>	<i>2011</i>	<i>2001</i>	<i>2011</i>
<i>Kolmogorov-Smirnov Z</i>	0.467	0.481	0.904	0.551
<i>Asymp. Sig. (2-tailed)</i>	0.981	0.975	0.387	0.921

Source: own compilation

- 4.) The relationship between the explanatory variables and the dependent variable can be best described with linear regression. The coefficients of determination support this assumption as they are the highest for linear regression.
- 5.) The predictors are linearly independent, i.e. it is not possible to express any predictor as a linear combination of the others. This assumption can be tested with the VIF measure. I consider multicollinearity acceptably low if the VIF value is not significantly more than 5. Besides, elements of the correlation matrix – except for elements in its diagonal – should be lower than the multiple coefficient of determination. This assumption is tested after carrying out the regression analyses.

Results

The results of the regression analysis for the Northern Hungarian region (Table 2) highlight that in 2001, the increase of average education attainment and the increasing size of dwellings could increase income level. Higher education attainment and bigger dwellings are associated with higher average income level.

By 2011, however, the effect of the size of the dwellings had changed. In 2011, bigger dwellings were associated with lower average income level. This can be possible because in bigger towns, the average income level is usually higher than in small villages, while the average size of dwellings can be lower partly because bigger towns are usually more crowded and per person size of dwellings is lower, partly because real estate prices are usually higher.

The effect of education attainment proved to be the same in 2011 than in 2001. The increase of average education attainment increases per person average income level. Besides the size of dwellings and education attainment, the effect of the rate of the elderly and unemployment rate also turned to be significant by 2011. The increase of the elderly rate decreases income level, which is probably due to the lower average level of pensions than that of income. As the rate of the elderly keeps increasing in the region, this effect has become considerable. Unemployment rate is also inversely related to the income level. A 1% increase in the unemployment rate decreases the

average annual income level by HUF 32,883. The rate of the Roma minority and the average number of children in families do not significantly influence income level.

Table 2: Results of the regression analyses in Northern Hungary

Predictor	2001		2011	
	Coefficient (t value)	VIF	Coefficient (t value)	VIF
Average education attainment	111 315 (8.715)	1.106	127 445 (2.192)	5.577
Rate of the elderly	-	-	-19 019 (-3.175)	1.47
Average number of children in 100 families	-	-	-	-
Average size of dwellings	1522.022 (3.115)	1.106	-10 112 (-2.846)	1.967
Unemployment rate	-	-	-32 883 (-4.829)	4.044
Rate of the Roma minority	n.e.	n.e.	-	-

n.e. not examined- The effect is not significant at the 0.05 level (2-tailed). Source: own compilation

As for the linear independency of the predictors, the bivariate correlation between average education attainment and the average size of dwellings is 0.31 in 2001. As the multiple coefficient of determination is higher (0.85) and the VIF values are lower than 5 (see Table 2), the linear independency of the predictors can be assumed in 2001. In 2011, all the correlations (Table 3) are lower than the multiple coefficient of determination (0.912) and the VIF value of the significant variables is not significantly higher than 5, therefore the linear independency of the predictors can be assumed.

Table 3: Correlation matrix of the significant predictors, Northern Hungary, 2011

	Average education attainment	Rate of the elderly	Average size of dwellings	Unemployment rate
Average education attainment	1	0.295	-0.529**	-0.819**
Rate of the elderly	0.295	1	-0.098	-0.407*
Average size of dwellings	-0.529**	-0.098	1	0.189
Unemployment rate	-0.819**	-0.407*	0.189	1

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Source: own compilation

In Borsod-Abaúj-Zemplén county, results are similar to the results of the region. While in 2001, only the average education attainment and the average size of dwellings affected income level significantly, the effect of the elderly rate and the unemployment rate became significant by 2011, too (refer to Table 4). Education attainment is positively, while the elderly rate, the average size of dwellings and the unemployment rate are inversely related to the income level.

Table 4: Results of the regression analyses in Borsod-Abaúj-Zemplén county

<i>Predictor</i>	<i>2001</i>		<i>2011</i>	
	<i>Coefficient (t value)</i>	<i>VIF</i>	<i>Coefficient (t value)</i>	<i>VIF</i>
<i>Average education attainment</i>	70 910 (5.641)	1.322	177 643 (2.512)	5.529
<i>Rate of the elderly</i>	-	-	-47 419 (-4.011)	1.217
<i>Average number of children in 100 families</i>	-	-	-	-
<i>Average size of dwellings</i>	2634.1 (6.684)	1.322	-9 459 (-2.274)	1.877
<i>Unemployment rate</i>	-	-	-30 578 (-3.762)	4.496
<i>Rate of the Roma minority</i>	n.e.	n.e.	-	-

n.e. not examined – The effect is not significant at the 0.05 level (2-tailed).

Source: own compilation

As for multicollinearity, the bivariate correlation between average education attainment and the average size of dwellings is 0.494 in 2001. As the multiple coefficient of determination is higher (0.949) and the VIF values are lower than 5 (see Table 4), the linear independency of the predictors can be assumed in 2001. In 2011, all the correlations (Table 5) are lower than the multiple coefficient of determination (0.945) and the VIF value of the significant variables is not significantly higher than 5, therefore the linear independency of the predictors can be assumed.

Table 5: Correlation matrix of the significant predictors, Borsod-Abaúj-Zemplén county, 2011

	<i>Average education attainment</i>	<i>Rate of the elderly</i>	<i>Average size of dwellings</i>	<i>Unemployment rate</i>
<i>Average education attainment</i>	1	0.487	-0.641*	-0.838**
<i>Rate of the elderly</i>	0.487	1	-0.155	-0.550*
<i>Average size of dwellings</i>	-0.641*	-0.155	1	0.393
<i>Unemployment rate</i>	-0.838**	-0.550*	0.393	1

* Correlation is significant at the 0.05 level (2-tailed)

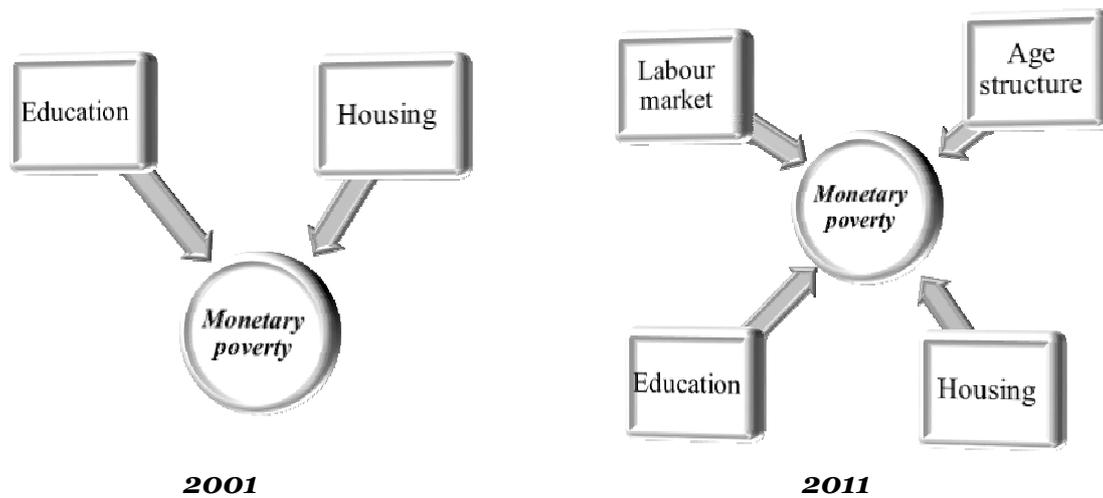
** Correlation is significant at the 0.01 level (2-tailed)

Source: own compilation

Conclusion

In 2001, poverty was mainly determined by education level and housing in Northern Hungary. In 2011, not only these two factors, but also labour market position and age structure of the population became significant factors of monetary poverty (see Figure 3). The main determinants of poverty were the same for Borsod-Abaúj-Zemplén county, too.

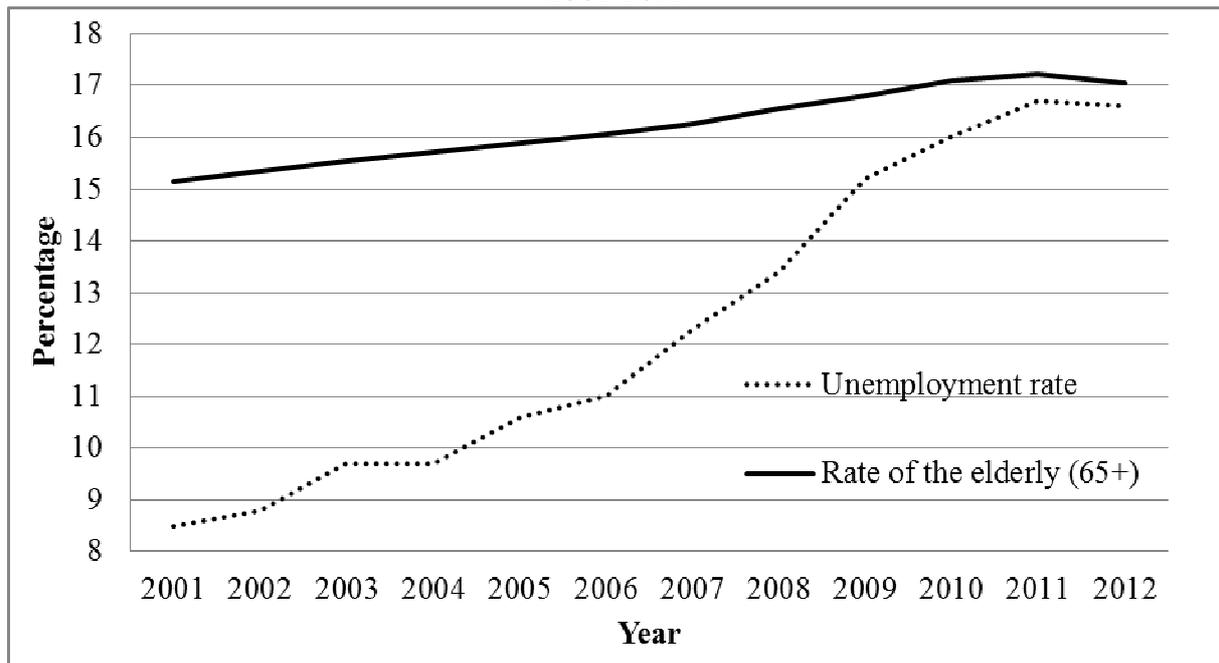
Figure 3: Determinants of poverty in the Northern Hungarian region in 2001 and in 2011



Source: own compilation

With the economic crisis, the role of labour market participation and the age structure became more significant. As both rates have followed a growing trend since 2001 in the region (see Figure 4), we can conclude that impoverishment in Northern Hungary is largely due to the unfavourable labour market circumstances (like the increasing unemployment rate) and to the unfavourable age structure of the population (increasing rate of the elderly). In order to alleviate poverty, improvements in the four areas are required. In the labour market, employment and activity should be promoted. As for education, the average education attainment should be increased. Housing circumstances should also be improved. As far as the age structure is concerned, the rate of the elderly should be decreased. It could be realised with increasing fertility and with motivating young people to have more children.

Figure 4: Unemployment rate and rate of the elderly in the Northern Hungarian region, 2001-2012



Source: own compilation based on the data of the Hungarian Central Statistical Office

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