



The educational structure of the population and its impact on spatial inequalities in household incomes and the working poor in Bulgaria

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INTRODUCTION

The territorial distribution of the population, with its demographic and ethno-religious features, combined with the historical, political, and contemporary economic development of Bulgaria, shapes the regional disparities in income and unemployment rates as well as the share of the working poor.

Currently, the rise of the working poor and the deepening wealth gap generate serious challenges to socioeconomic development, and these issues are closely linked to extensive European research on spatial inequalities and labor market segmentation.

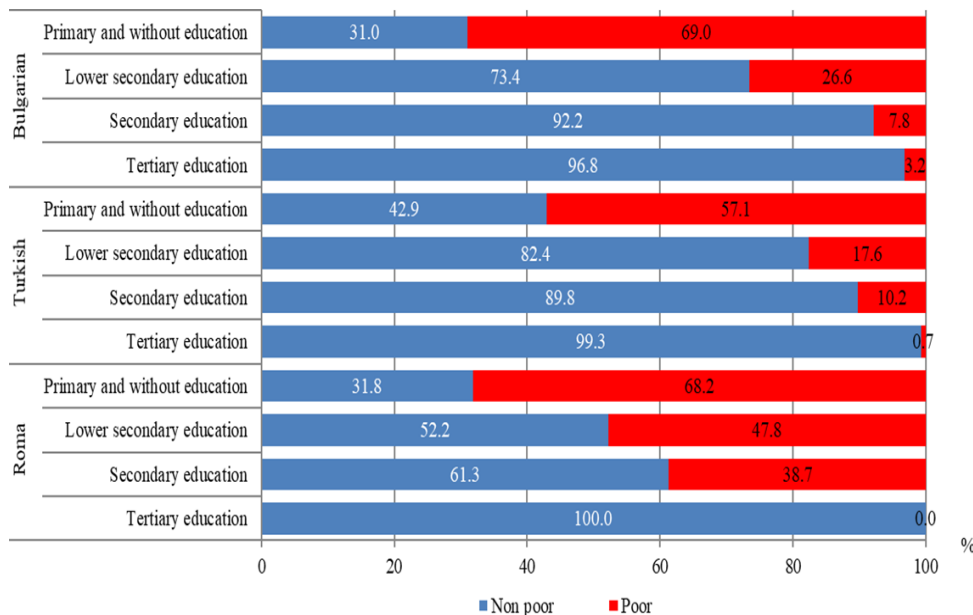
Examining the impact of the educational structure on poverty and incomes of the population, the paper builds on prior studies in Bulgaria and abroad, applying a strong spatial approach and a variety of indicators (demographic, economic, and social).

The study aims to explore the impact of the educational structure of the population, respectively, the labour force, on the evolution of inequalities and spatial differences in household income, as well as the number and share of working poor in the country's regions at the NUTS 3 level.



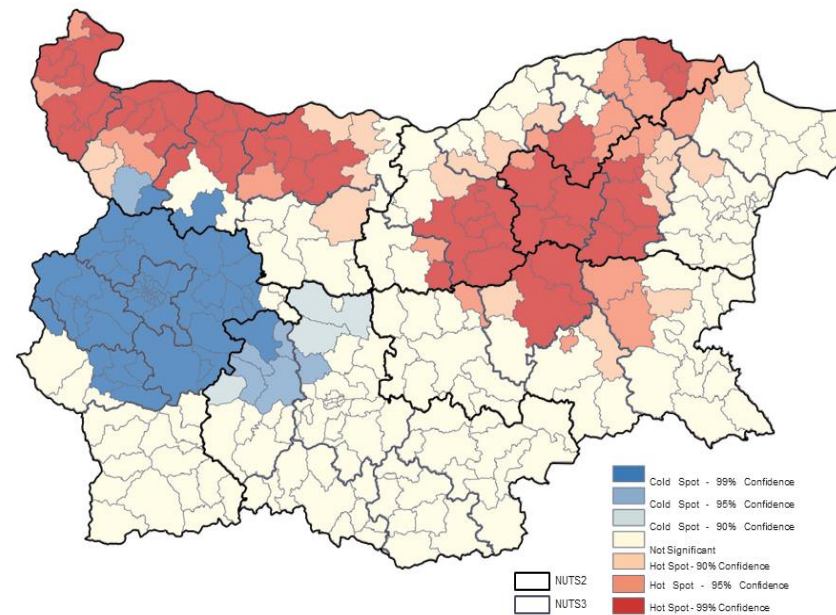
LITERATURE REVIEW

Share of the employed by education, risk of poverty, and ethnic group in 2022



Source: Poverty and social inclusion indicators in 2022, National Statistical Institute of the Republic of Bulgaria, https://www.nsi.bg/en/file/24256/SILC2022_en_4UPGZS4.pdf

Hot-Spot analysis of the share of the poor in the municipalities in Bulgaria



Source: Poverty mapping in the Republic of Bulgaria, National Statistical Institute, World Bank Group, 2018



DATA AND METHODS

Studied territory: Bulgaria

Spatial level: NUTS-3 regions according to Eurostat - 28 districts (oblasti)

Selected are **12 indicators** divided into **2 groups (data for 2023):**

Indicators for socioeconomic inequality – income inequality(Gini coefficient), relative share of the poor to the poverty line for the district (%), relative share of the population living in material and social deprivation (%), relative share of population living in households with low economic activity intensity aged 18 to 64 years (%), relative share of population at risk of poverty or social exclusion (%), average annual salary of employees under labor and service laws (lv)

Indicators for labor market and education: unemployment rate (%), employment rate of the population aged 15-64 (%), economic activity rate of the population aged 15-64 (%), relative share of population aged 25-64 with tertiary education (%), relative share of population aged 25-64 with primary and lower education (%), number of people not in the labor force (inactive population).

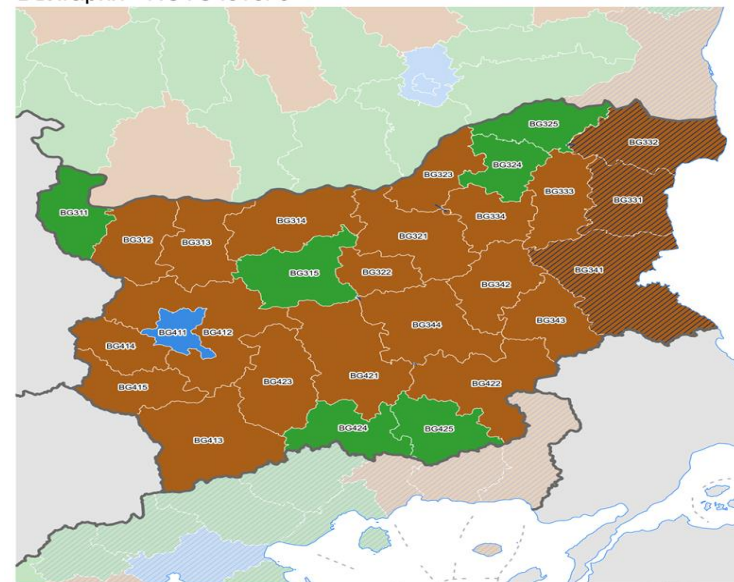
Source of statistical data: National Statistical Institute of the Republic of Bulgaria (www.nsi.bg) and Employment Agency of Bulgaria – Ministry of Labour and Social Policy (<https://www.az.government.bg>).

Applied statistical methods – cluster analysis and correlation

K-Means cluster analysis – K=5

Pearson's correlation coefficient

България - NUTS level 3



Urban Rural typology

- Predominantly urban region
- Intermediate regions
- Predominantly rural regions
- Coastal NUTS regions

eurostat

Administrative boundaries: © EuroGeographics © OpenStreetMap contributors © Turstat
Cartography: Eurostat — GISCO, 11/2024

Source: <https://ec.europa.eu/eurostat/documents/345175/20613256/bulgaria-nuts-2024-level-3.png/ccc01ff7-778e-0923-74aa-b34e0c2489c?t=1734449354919>



RESULTS – CLUSTER ANALYSIS

✓ **Cluster 1 – Most socially and economically vulnerable regions – 8 districts (Razgrad, Silistra, Vidin, Dobrich, Vratsa, Pleven, Targovishte, and Sliven)**

The highest levels of poverty and socioeconomic deprivation (population living in social and material deprivation – 24.3 % and at risk of poverty and social exclusion – 34.3%)

Unfavorable educational structure of the population (the highest share of people with primary and lower education - 23%) and share of university graduates below the average for Bulgaria (~24%)

The highest rates of unemployment (~8%) and significantly lower incomes compared to the country's average (BGN 18500)

Low economic activity (69 %) and employment (62 %) rates

Moderate inequality in income distribution (Gini index ~ 38)

✓ **Cluster 2 – Less developed regions – 4 districts (Lovech, Haskovo, Montana, Kardzhali)**

Relatively low economic activity (~66.5%) and employment (~63.6%) rates, but low unemployment (4.3%)

Moderate levels of poverty and socioeconomic deprivation (population living in social and material deprivation – 10.4% and at risk of poverty and social exclusion – 25.7%)

Relatively high levels of population with primary or lower education (17.9%) and university graduates are below the average for Bulgaria

Lower incomes compared with other clusters and the average of the country (BGN 17500), and a higher share of people living in households with low work intensity



✓ **Cluster 3 – Highly developed regions with increasing inequalities – capital Sofia district**

The highest economic activity and employment – over 76.5% employed and 78.7% economic activity rate

The highest proportion of university graduates – over 54%

Low share of population living in social and material deprivation (8.4%)

Highest incomes in the country – average annual salary over BGN 34000

The lowest unemployment rate - 2.7%

The highest value of the Gini index (39.3) and more than 22.2. % below the district poverty line

✓ **Cluster 4 - Developed regions with low inequalities – 10 districts (Varna, Veliko Tarnovo, Sofia, Smolyan, Blagoevgrad, Ruse, Kystendil, Gabrovo, Shumen, Yambol)**

Lower levels of poverty (15.9%) and share of the population living in socioeconomic deprivation (12.6%) than in cluster 1

Incomes are lower than the country's average (18900), but higher than in clusters 1 and 2

High economic activity (75.5%) and moderate employment rates (71.9%), but with a larger number of the population outside the labor force

Relatively good educational structure (25.6% university graduates), combined with lower levels of population with primary or lower education (13.7)

✓ **Cluster 5 – Developed regions with high inequalities – 5 districts (Plovdiv, Pernik, Stara Zagora, Pazardzhik, and Burgas)**

Favorable educational structure (34.1% of the population has a tertiary education), but higher levels of population with primary or lower education (17.6%) than in cluster 4

Moderate economic activity (74.2%) and lower employment rates (70.2%), and the largest number of the population outside the labor force

Higher average salary (BGN 19906) than cluster 4, but still below the country's average (BGN 24500)

Higher disparities compared to cluster 4:

- share of the population at risk of social exclusion and poverty - 34.1%
- share of the population living in socioeconomic deprivation – 22.0%



RESULTS-CORRELATION COEFFICIENTS

2023	Relative share of the population living in material and social deprivation (%)	Inequality in income distribution/ Gini coefficient	Relative share of poor people in relation to the poverty line for the region (%)	Average annual salary of employees under labor and service laws (lv)	Persons living in households with low economic activity intensity aged 18 to 64 years (%)	Population at risk of poverty or social exclusion (%)	Relative share of the population aged 25 to 64 with tertiary education (%)	Unemployment rate (%)	Employment rate of the population aged 15-64 (%)	Economic activity rate of the population aged 15-64 (%)	Persons outside the labor force - thousand persons	Relative share of the population aged 25 to 64 with primary and lower education (%)
Relative share	1	0.25	-0.07	-0.06	0.48	0.84	-0.09	0.19	-0.26	-0.22	-0.04	0.49
Inequality in in	0.25	1	0.12	0.34	0.31	0.17	0.2	0	-0.29	-0.4	0.32	0.2
Relative share	-0.07	0.12	1	0.26	-0.18	0.35	0.1	-0.02	0.21	0.28	0.24	-0.15
Average annua	-0.06	0.34	0.26	1	-0.34	-0.01	0.76	-0.3	0.42	0.38	0.83	-0.34
Persons living	0.48	0.31	-0.18	-0.34	1	0.51	-0.32	0.48	-0.71	-0.66	-0.28	0.48
Population at	0.84	0.17	0.35	-0.01	0.51	1	-0.08	0.28	-0.27	-0.18	-0.02	0.34
Relative share	-0.09	0.2	0.1	0.76	-0.32	-0.08	1	-0.35	0.56	0.51	0.79	-0.42
Unemployment	0.19	0	-0.02	-0.3	0.48	0.28	-0.35	1	-0.68	-0.2	-0.44	0.51
Employment r	-0.26	-0.29	0.21	0.42	-0.71	-0.27	0.56	-0.68	1	0.85	0.48	-0.54
Economic activ	-0.22	-0.4	0.28	0.38	-0.66	-0.18	0.51	-0.2	0.85	1	0.33	-0.39
Persons outsid	-0.04	0.32	0.24	0.83	-0.28	-0.02	0.79	-0.44	0.48	0.33	1	-0.37
Relative share	0.49	0.2	-0.15	-0.34	0.48	0.34	-0.42	0.51	-0.54	-0.39	-0.37	1



The widening of economic, social, and demographic disparities in Bulgaria has been an intensifying process in recent years, and the districts in the country with a high share of the population living below the poverty line are expanding, as well as the increase in the number of working poor.

Educational attainment is a key variable in shaping the spatial differences in income and social status. The results confirm that investment in education, especially in less developed regions, could significantly reduce inequalities, increase employment, and limit the phenomenon of the working poor.

Regional differences are clearly pronounced:

- ✓ Sofia's capital district forms a separate cluster due to exceptionally high values for population with tertiary education, employment, and incomes, but at the expense of the highest inequality and a high share of poor people.
- ✓ On the contrary, cluster 1 comprises highly vulnerable regions (8 districts mainly located in Northern Bulgaria) with lower incomes, high poverty, and unfavorable educational structures.
- ✓ The remaining clusters have a distinctive profile based on the data of their demographic, social, and economic development.



The following conclusions can be drawn from the correlation matrix:

- ✓ Education is a key predictor of income and poverty. There is a strong positive correlation between the proportion of university graduates and the average annual salary ($r = +0.76$).
- ✓ Districts with a higher proportion of people with higher education have lower levels of poverty, unemployment, and social deprivation.
- ✓ Conversely, a high proportion of the population with primary or lower education is associated with lower wages ($r = -0.34$), higher poverty and social exclusion ($r = +0.34$), and higher unemployment ($r = +0.50$).
- ✓ Population with lower education is often associated with low economic activity intensity ($r = +0.48$).
- ✓ Weaker correlation of the educational level of the population and inequality in income distribution (Gini coefficient), suggesting that it is influenced by other factors ($r = +0.20$).



THANK YOU FOR YOUR ATTENTION!

Funding program

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Additional information

- ✓ The NSI defines the working poor as persons who earn incomes above the poverty line but are unable to meet their basic needs and live below the poverty line. During 2014-2024, their relative share varies between 7.8 % (2015) to 12.1 % (2024). There is an obvious tendency for an increase in the share of working poor since 2019.