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Content

Analysis of the similarity of unemployment development in individual regions of the Czech Republic in the years 2009-2024

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Abstract

This thesis deals with unemployment in the regions of the Czech Republic. The aim of the thesis was to analyze the development of unemployment in the regions of the Czech Republic between 2009 and 2024 and to identify groups of regions with similar unemployment trends. The influence of the educational structure of the population was also taken into account. To achieve this goal, content analysis and cluster analysis were used to group regions based on the similarity of their long-term unemployment trends. The research showed that unemployment trends are regionally differentiated, stable in the long term, and strongly related to the educational structure of the population. Regions with a higher proportion of university-educated people had lower unemployment and higher labor market adaptability, while regions with structural problems had the highest long-term unemployment. The study thus provided a new perspective on regional differentiation in unemployment and confirmed the importance of education. A limitation of the research is that it does not include other factors that may influence the labor market. These facts leave room for further studies in this area.

Keywords: Cluster analysis, educational structure, labor market, regional differentiation, unemployment.

Introduction

Unemployment, as one of the fundamental problems of macroeconomics, does not only affect a country as a whole but also influences individual regions and their socio-economic

development. Understanding labor market trends is therefore crucial for implementing policies aimed at transforming the labor market, as well as for the socio-economic development of regions and the country as a whole (Kurilo, 2021). Unemployment is thus a priority objective of economic policies (Doganer, 2022). Beyond the macroeconomic level, however, unemployment also negatively affects the psychological well-being of individuals who are unemployed (Albertini & Piccitto, 2022).

Unemployment has a contradictory effect on early termination of higher education. On the one hand, it reduces opportunity costs, while on the other hand, it decreases the expected returns from completed education (Lopes & Rebelo, 2025). A major issue in today's world is also youth unemployment in developing economies. Young people often face higher unemployment rates than older individuals who already have experience, and they have fewer opportunities to transition into employment (Dhingra & Kondirolli, 2023). According to Miana et al. (2022), e-learning has a significant impact on reducing youth unemployment. Education thus creates opportunities to obtain quality employment while reducing unemployment (Olkeba et al., 2023).

According to Jo et al. (2023), increasing the unemployment rate and reducing voluntary unemployment can lower future unemployment more effectively than policies focused on increasing the number of jobs.

Unemployment is also influenced by tariffs and free trade. Free trade not only increases overall welfare but also raises income inequality and unemployment within a country. Global tariffs, on the other hand, reduce welfare but also decrease unemployment and income inequality (Dinopoulos et al., 2024).

According to Damaske et al. (2023), 73% of employees in primary employment spend most of their 20s, 30s, and 40s with relatively low risk of unemployment. Chronic unemployment characterizes the labor market experiences of about 9% of individuals. The risk of unemployment is also influenced by factors such as experiences with long-term unemployment in early adulthood and labor market constraints. Additionally, while men and women face similar unemployment risks at the beginning of their careers, over time men become more vulnerable to unemployment. Individuals with darker skin are significantly more exposed to unemployment risks. For most people, the risk of unemployment at the start of their careers gradually gives way to more stable employment. The life stage of an

individual is therefore very important for understanding the relationship between unemployment and labor market insecurity.

The overall unemployment rate in the Czech Republic in 2024 was 2.6%, and the economic activity rate was 60.6% (CZSO, 2025).

The aim of this paper is to compare the development of unemployment across the regions of the Czech Republic between 2009 and 2024 and, using hierarchical cluster analysis, to identify similarities and differences among these regions.

In line with the objective of this paper, the following research questions are defined:

The first research question examines the development of unemployment in the regions of the Czech Republic between 2009 and 2024. It helps to specify similarities and differences among regions and demonstrates how the labor market situation has evolved. It is important for understanding unemployment trends as well as regional disparities. At the same time, it also contributes to answering RQ2.

RQ1: How has unemployment evolved in the regions of the Czech Republic between 2009 and 2024?

The second research question builds on RQ1 and focuses on identifying homogeneous groups of regions. It enables the determination of which regions exhibit similar unemployment trends and share similar characteristics. It is important for improving regional policy.

RQ2: Which groups of regions exhibit similar unemployment trends, and how do these groups differ in terms of the educational structure of the population?

Data and Methods

Methods

In the following chapter, the data and methods used will be described. The data and their collection will be presented, as well as the methods of data collection and processing.

Data and Data Collection

For the processing and analysis of the obtained data, the method of hierarchical cluster analysis will be used, which represents one of the most commonly applied methods of multivariate statistical analysis. Its main objective is to identify groups of objects that are

similar to each other in terms of selected indicators and, conversely, different from other groups. The method thus makes it possible to reveal the natural structure of the data without prior knowledge of the number or nature of the groups.

In this paper, hierarchical cluster analysis will be applied to identify structural similarities and differences between individual units based on selected socio-economic indicators, particularly those related to the labor market, employment, and unemployment. The aim is to create clusters of regions (or other analyzed entities) that share similar characteristics within key economic and social factors. The obtained results of the hierarchical cluster analysis will make it possible to better understand the spatial distribution and relationships between individual areas, identify regions with similar development trends, and also reveal possible disparities within the examined dataset. The method will contribute to a detailed understanding of the data and to the formulation of conclusions and recommendations.

To measure the distance between individual objects, Euclidean distance will be used, which is one of the most commonly applied measures in multivariate analysis.

The following formula will be used for the calculation:

$$d_{ij} = \sqrt{\sum_{k=1}^{n} (x_{ik} - x_{jk})^2} \tag{1}$$

where:

d_{ij} – distance between regions i and j

x_{ik}, x_{jk} – values of variable k for individual regions

n – number of variables (GeeksforGeeks, 2025)

With regard to the clustering method itself, Ward's method will be applied, as it minimizes the loss of information when merging groups and ensures the formation of the most homogeneous clusters possible. This approach makes it possible to effectively reveal natural relationships between objects and provides a reliable basis for their further interpretation. The result is a dendrogram, which graphically represents the hierarchical structure of relationships between objects and allows for easy visual identification of the most similar units. The optimal number of clusters will be determined by a combination of visual interpretation of the dendrogram and calculation of the silhouette coefficient:

$$s(i) = \frac{b(i) - a(i)}{max\{\text{a(i)}, \text{b(i)}\}} \quad (2)$$

where:

a(i) – average distance of object i to other objects within the same cluster

b(i) – average distance to the nearest neighboring cluster (AMSE Conference, 2018)

For calculations and visualization, MS Excel will be used.

Procedure

1. Data collection: Downloading data from public databases of the Czech Statistical Office (CZSO) for the period 2009-2024 (always valid as of December 31 of the given year) and applying content analysis
2. Data processing: Application of hierarchical cluster analysis, specifically Euclidean distances and Ward's method
3. Evaluation: Evaluation of the dendrogram and silhouette coefficient
4. Interpretation of results: Description of the resulting groups of regions and identification of differences in unemployment development

Results

In the Results chapter, which represents the output of the chosen method, the results of the conducted cluster analysis of the regions of the Czech Republic will be presented in detail and clearly. The analysis focuses on evaluating the similarity of unemployment trends over the period 2009-2024.

Cluster analysis

For the implementation of the cluster analysis, the input data consisted of a time series of the share of unemployed persons in individual regions of the Czech Republic over the period 2009-2024 (see Table 1).

Table 1: Share of Unemployed Persons in the Years 2009-2024

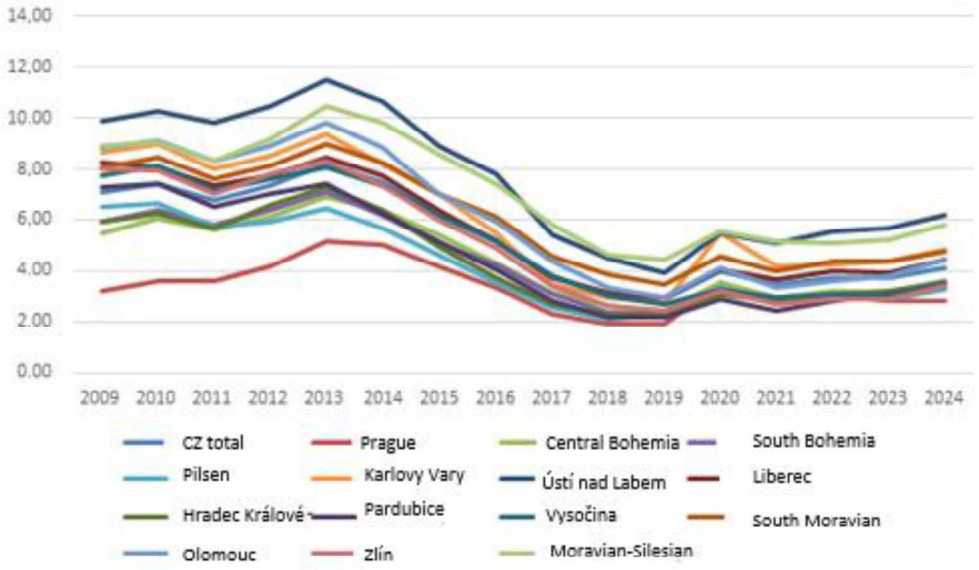
Region / Territory	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Czech Republic total	7.12	7.40	6.77	7.37	8.17	7.46	6.24	5.19	3.77	3.07	2.87	4.02	3.49	3.72	3.73	4.10
Prague	3.24	3.61	3.59	4.16	5.14	05.03	4.20	3.35	2.34	1.93	1.90	3.51	2.76	3.04	2.80	2.80
Central Bohemian	5.51	6.09	5.62	6.13	6.90	6.36	5.41	4.31	3.17	2.64	2.44	3.52	2.98	3.23	3.17	3.36
South Bohemian	5.92	6.39	5.81	6.38	7.10	6.20	5.07	4.28	3.09	2.38	2.31	3.19	2.82	2.98	3.12	3.60
Plzeň	6.50	6.64	5.75	5.94	6.45	5.70	4.62	3.56	2.55	2.12	2.33	3.36	2.78	2.94	2.90	3.26
Karlovy Vary	8.66	8.94	7.98	8.51	9.33	8.21	7.06	5.45	3.47	2.93	2.74	5.45	4.18	4.24	4.38	4.85
Ústí nad Labem	9.87	10.23	9.79	10.47	11.47	10.67	8.91	7.79	5.39	4.50	3.90	5.46	5.08	5.54	5.66	6.21
Liberec	8.29	8.06	7.34	7.75	8.46	7.72	6.36	5.17	3.76	3.18	2.95	4.06	3.66	3.97	3.93	4.46
Hradec Králové	5.96	6.28	5.68	6.55	7.31	6.36	4.96	3.76	2.72	2.31	2.38	3.11	2.83	3.10	3.19	3.56
Pardubice	7.32	7.45	6.50	7.03	7.45	6.22	5.14	4.04	2.83	2.19	2.20	2.92	2.45	2.86	3.10	3.44
Vysočina	7.72	8.10	7.16	7.63	8.05	7.35	6.22	5.17	3.80	3.02	2.70	3.31	2.99	3.08	03.05	3.49
South Moravian	8.05	8.45	7.61	8.15	8.94	8.25	7.01	6.11	4.60	3.86	3.48	4.55	4.02	4.36	4.37	4.74
Olomouc	8.86	9.08	8.33	8.93	9.79	8.82	7.01	5.94	4.35	3.37	2.94	4.11	3.35	3.63	3.81	4.43
Zlín	7.98	7.91	7.00	7.82	8.34	7.36	5.98	4.92	3.43	2.61	2.43	3.22	2.73	2.89	2.88	3.41
Moravian-Silesian	8.88	9.04	8.31	9.18	10.47	9.80	8.56	7.45	5.77	4.65	4.44	5.55	5.14	5.12	5.23	5.82

Source: Own.

Table 1 shows the share of unemployed persons in the years 2009-2024 (in %). This table was essential for conducting the entire cluster analysis; therefore, it is considered important to present it in this paper. The time series clearly indicates that, in all regions of the Czech Republic, there was a significant decrease in unemployment after 2009. Specifically, following the period of the economic crisis between 2009 and 2013, there was a gradual improvement in the labor market. This improvement peaked in the years 2018-2019, when the share of unemployed persons reached its lowest values. This positive trend was temporarily disrupted in 2020 in connection with the COVID-19 pandemic. However, the subsequent economic recovery once again led to a slight decline in unemployment.

For better visualization of the share of unemployed persons in the years 2009-2024, see Graph 1 below. Although this graph presents the same indicator as Table 1, it provides a clearer and more intuitive understanding.

Graph 1: Share of Unemployed Persons in the Years 2009-2024



Source: Own.

In terms of individual regions, the lowest share of unemployed persons is found in the Capital City of Prague, where unemployment has consistently remained below the national average. In 2024, the share of unemployed persons was only 2.8%. Low values are also observed in the Central Bohemian, Pardubice, South Moravian, and Zlín regions. These regions showed a stable development over time.

On the contrary, the highest shares of unemployed persons were consistently recorded in the Ústí nad Labem, Moravian-Silesian, and Karlovy Vary regions. Despite the overall decline, unemployment levels in these regions remained above the Czech Republic's average. The South Bohemian, Plzeň, Hradec Králové, Olomouc regions, and the Vysočina region were characterized by relative stability without significant fluctuations.

Despite the overall improvement in the labor market situation across the country, significant differences between individual regions persisted. Economically stronger regions achieved low unemployment rates, while structurally weaker regions remained below average in terms of unemployment in the long term.

Application of Euclidean Distance and Ward's Method

Table 2 below shows the determination of Euclidean distances. The green color indicates regions with a similar share of unemployed persons, while the red color indicates regions with differing shares of unemployed persons. Subsequently, Ward's method was applied to

merge individual groups. With the help of this method, the most homogeneous clusters possible were formed.

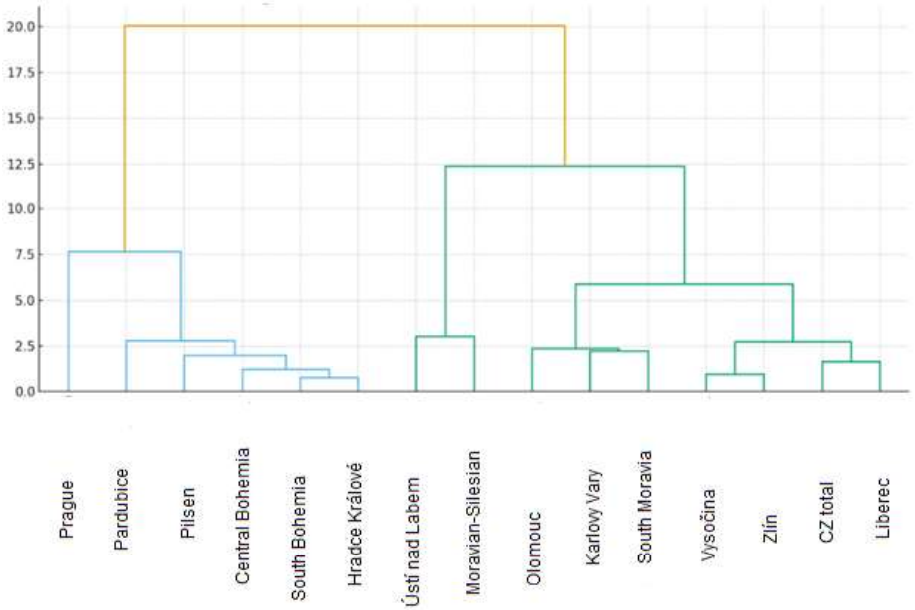
Table 1: Euclidean distance

Region / Territory	Czech Republic total	Prague	Central Bohemian	South Bohemian	Plzeň	Karlovy Vary	Ústí nad Labem	Liberec	Hradec Králové	Pardubice	Vysočina	South Moravian	Olomouc	Zlín	Moravian-S.
Czech Republic total	0	8.975988	3.716903	3.586312	4.583597	3.747635	9.547617	1.649593	3.776245	3.284197	1.768558	3.066558	4.113531	2.250915	7.34022
Prague	8.975988	0	5.343949	5.777177	5.52721	12.37345	18.30007	10.649593	5.764792	7.588748	9.531859	11.87012	13.00898	9.470283	15.8287
Central Bohemian	3.716903	5.343949	0	0.941231	2.01283	7.264136	13.21201	5.20821	1.286811	2.888137	4.238575	6.707102	7.705227	4.286665	10.8843
South Bohemian	3.586311	5.777177	0.941231	0	1.593583	7.065185	13.09308	4.957988	0.764484	2.128998	3.877109	6.613853	7.418809	3.802587	10.8734
Plzeň	4.583597	5.52721	2.01283	1.593583	0	7.747491	14.00658	5.705204	1.565935	2.309475	4.642551	7.535223	8.252682	4.471257	11.8495
Karlovy Vary	3.747634	12.37345	7.264136	7.065185	7.747491	0	6.577035	2.505887	7.142789	6.140267	4.154097	2.240673	2.354579	4.418902	5.02189
Ústí nad Labem	9.547616	18.30007	13.21201	13.09308	14.00658	6.577035	0	8.337211	13.21995	12.27201	9.81403	6.609022	6.198863	10.19924	3.03656
Liberec	1.649592	944793	5.20821	4.957988	5.705204	2.505887	8.337211	0	5.07873	4.085509	2.075795	2.121182	2.889359	2.499876	6.3561
Hradec Králové	3.776245	5.764792	1.286811	0.764484	1.565935	7.142789	13.21995	5.07873	0	2.142052	4.092377	6.806417	7.543304	3.915379	11.0487
Pardubice	3.284197	7.588748	2.888137	2.128998	2.309475	6.140267	12.27201	4.085509	2.142052	0	2.798719	6.028658	6.313671	2.427382	10.3574
Vysočina	1.768558	9.531859	4.238575	3.877109	4.642551	4.154097	9.81403	2.075795	4.092377	2.798719	0	3.646903	3.838615	0.946189	7.87605
South Moravian	3.066558	11.87012	6.707102	6.613853	7.535223	2.240673	6.609022	2.121182	6.806417	6.028658	3.646903	0	2.331854	4.246068	4.38154
Olomouc	4.113531	13.00898	7.705227	7.418809	8.252682	2.354579	6.198863	2.889359	7.543304	6.313671	3.838615	2.331854	0	4.099378	4.84979
Zlín	2.250915	9.470283	4.286665	3.802587	4.471257	4.418902	10.19924	2.499876	3.915379	2.427382	0.946189	4.246068	4.099378	0	8.39334
Moravian-Silesian	7.34022	15.8287	10.8843	10.8734	11.84946	5.021895	3.036559	6.356095	11.0487	10.35739	7.876052	4.381538	4.84979	8.393336	0

Source: Own.

After applying the Euclidean distance, the individual clusters can also be clearly visualized using a dendrogram (see Graph 1)

Graph 1: Dendrograph



Source: Own.

Based on the dendrogram, it was observed that the regions clustered into three natural groups. This classification was further confirmed by the calculation of the silhouette coefficient, which showed the highest value precisely at three clusters. The silhouette coefficient ranged between 0.35 and 0.45, indicating a moderate level of group homogeneity, as well as sufficiently clear separation between the individual clusters.

Resulting Clusters of Regions

Based on the results of the analysis, it was found that the regions of the Czech Republic can be divided into three clusters according to the development of the share of unemployed persons in the period 2009-2024. Each of these clusters exhibited a similar trend in the development of unemployment shares, while at the same time differing from the others in terms of level and stability of values.

Cluster 1 included regions with long-term low and stable unemployment, such as the Capital City of Prague, Central Bohemian, Pardubice, South Moravian, Zlín, and Liberec regions.

Cluster 2 consisted of regions with an average level of unemployment and relatively stable development. This group included the South Bohemian, Plzeň, Hradec Králové, Vysočina, and Olomouc regions. This cluster is characterized by industrial and agricultural activities; however, the labor market is less dynamic.

Cluster 3 comprised regions with the highest levels of unemployment, namely the Karlovy Vary, Ústí nad Labem, and Moravian-Silesian regions. These regions have long faced structural problems in the labor market, a lower share of highly educated population, and a higher proportion of manual occupations.

Linking Clusters with the Educational Level of the Population (Complementary Characteristic)

Table 2: Education structure of the population

Education level	Prague	Central B.	South B.	Plzeň	Karlovy V.	Ústí n. L.	Liberec	Hradec K.	Pardubice	Vysočina	South M.	Olomouc	Zlín	Moravian-S.
Share of persons aged 15+	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No education	0.4	0.6	0.6	0.7	1.3	1.3	0.8	0.6	0.7	0.5	0.5	0.7	0.6	0.8
Primary (incl. unfinished)	8.3	12.9	13.5	14.0	18.4	18.2	14.7	13.4	13.3	12.9	12.7	13.5	13.6	14.7
Secondary vocational (without GCSE)	18.1	32.2	35.4	35.2	37.5	36.7	36.7	36.0	36.9	38.3	31.6	35.3	36.2	35.6
Full secondary general (with GCSE)	16.1	14.3	13.0	13.4	13.3	12.9	13.3	12.9	12.5	12.5	13.1	13.1	12.9	12.4
Full secondary technical (with GCSE)	15.8	17.3	17.0	17.0	15.0	15.8	16.1	17.6	17.4	17.1	16.1	16.7	16.4	16.3
Follow-up courses	3.0	2.9	17.0	2.6	2.5	2.5	2.8	3.1	2.9	2.9	2.8	2.7	2.8	2.6
Higher professional (conservatory)	2.4	1.9	2.8	1.7	1.4	1.3	1.5	1.7	1.8	1.7	1.6	1.5	1.3	1.2
University - Bachelor's	7.3	3.7	1.7	3.6	2.6	2.8	3.2	3.2	3.2	3.3	4.2	3.4	3.5	3.6
University - Master's	26.1	13.4	3.6	11.2	7.7	8.2	10.5	10.9	10.8	10.4	16.1	12.4	12.3	12.2
University - Doctoral	2.5	0.8	11.7	0.6	0.3	0.3	0.5	0.6	0.6	0.4	1.4	0.8	0.5	0.6

Source: ČSÚ, 2021.

Table 3 presents the percentage distribution of individual levels of educational attainment. This complementary characteristic was linked to the individual clusters and helped to create a more comprehensive picture of unemployment within these clusters.

Cluster 1 (Capital City of Prague, Central Bohemian, Pardubice, South Moravian, Zlín, Liberec regions):

This group is characterized by a higher proportion of individuals with tertiary education (particularly in Prague and the South Moravian region), as well as a significant share of individuals with secondary vocational education (with an apprenticeship certificate). Cluster 1 thus represents regions with a more balanced educational structure—a high proportion of vocationally trained individuals alongside an above-average share of university graduates. These regions consistently achieve lower unemployment rates, to which the educational structure contributes.

Cluster 2 (South Bohemian, Plzeň, Hradec Králové, Vysočina, Olomouc regions):

In all these regions, secondary education without a school-leaving examination (vocational training) predominates, often complemented by a higher proportion of individuals with full secondary vocational education with a school-leaving examination (approximately 16-17%). These regions exhibit a stable but less diversified educational structure compared to Cluster 1. However, this structure corresponds to their economic orientation, as industry and technical professions prevail.

Cluster 3 (Karlovy Vary, Ústí nad Labem, Moravian-Silesian regions):

These regions are characterized by the lowest proportion of tertiary-educated individuals (approximately 7-10%) and a high share of individuals with secondary education without a school-leaving examination (around 36-38%). The high proportion of individuals with lower levels of education, such as basic education or secondary education without a school-leaving examination, may be one of the factors contributing to persistent labor market problems in these regions. In terms of educational structure, these are regions where the workforce is predominantly concentrated in manual and technical occupations.

In all regions of the Czech Republic, with the exception of Prague, secondary education without a school-leaving examination (vocational training) was the most prevalent. This type of education represents the largest group within the population aged 15 and over, accounting for approximately 35-38% in most regions. Only in Prague did tertiary (master's level) education dominate, reaching 36.1%, which clearly distinguishes the capital city from other regions (see Table 3).

Discussion

RQ1: How has unemployment evolved in the regions of the Czech Republic between 2009 and 2024?

The results of the cluster analysis demonstrated that the development of unemployment across the regions of the Czech Republic in the period 2009-2024 is not homogeneous. Regional differentiation is significant and long-term stable. Regions that exhibited higher unemployment at the beginning of the observed period, such as the Ústí nad Labem and Moravian-Silesian regions, remained among those with the highest unemployment levels in subsequent years. In contrast, regions such as the Capital City of Prague, the Plzeň region, and the South Bohemian region consistently showed the lowest values.

The development of unemployment thus indicates that unemployment is not a short-term fluctuating phenomenon, but rather has a structural character that does not change significantly over time. The results confirm that regional differences exhibit persistence and are not merely a reflection of economic cycles. This trend corresponds with the conclusions of Kurilo (2021), who identifies institutional and structural determinants as key factors of regional unemployment. Similarly, the findings of Gil-Alana et al. (2024) on the long memory

of time series suggest that unemployment tends to maintain its levels over time, which is also evident in the regions of the Czech Republic.

The results further indicate that regions with weaker economies respond more slowly to economic recovery, as seen in the Ústí nad Labem and Moravian-Silesian regions. This finding is consistent with the principle of hysteresis, as examined by Doganer (2022).

Additionally, it was found that significant regional disparities may also influence migration flows, leading to an outflow of economically active population.

The results confirm that the development of unemployment is long-term, stable, and closely linked to the structural characteristics of regions rather than being a cyclically variable process. At the same time, they highlight the important role of regional socio-economic inequalities, which are not solely of a macroeconomic nature.

RQ2: Which groups of regions exhibit similar unemployment trends, and how do these groups differ in terms of the educational structure of the population?

The conducted cluster analysis identified three main clusters of regions in the Czech Republic with distinct unemployment trends. These clusters reflect socio-economic and educational differences among individual regions.

Cluster 1 is characterized by low unemployment and a high level of education and includes Prague, the Central Bohemian region, and the Plzeň region. It is marked by a stable economy and a higher proportion of tertiary-educated population. These regions have a strong economic base and a highly adaptable workforce. This result corresponds with the findings of Fleka et al. (2022) and Mulero and Garcia-Hiernaux (2022), which confirm that high-quality working conditions, digitalization, and labor mobility contribute to better employment outcomes and lower unemployment.

Cluster 2 is characterized by stability and includes regions such as Vysočina, Zlín, South Bohemian, and Pardubice. These regions exhibit average unemployment levels, relatively stable development, and a slightly increasing share of higher-educated population.

Cluster 3 is characterized by the highest unemployment and lower levels of education and includes the Ústí nad Labem, Moravian-Silesian, and Karlovy Vary regions. Common characteristics include structural unemployment, lower educational attainment, and historical economic burdens such as the decline of heavy industry and low economic growth.

These findings are consistent with Ahn (2023), who emphasizes that regions with longer unemployment duration tend to exhibit weaker structural labor market conditions.

From the author's perspective, the results demonstrate that education is one of the key factors differentiating groups of regions. Regions with higher levels of education tend to have lower unemployment, greater adaptability, and more stable labor markets. This confirms the findings of Riva et al. (2021), who argue that education contributes to greater job stability, as well as Harmannssonová et al. (2024), who state that the expansion of tertiary education can reduce youth unemployment.

Compared to previous authors, who predominantly used econometric models, this study employed cluster analysis, which made it possible to reveal hidden structures in the data and assign regions into homogeneous groups. The results thus provide a new perspective on regional differentiation in unemployment and demonstrate that unemployment development across Czech regions is neither homogeneous nor random, but rather follows long-term patterns, with the educational structure of the population being an important factor influencing unemployment trends. The findings are consistent with and confirm the conclusions of the aforementioned authors.

Conclusion

The aim of this paper was to compare the development of unemployment across the regions of the Czech Republic between 2009 and 2024 and, using hierarchical cluster analysis, to identify similarities and differences among individual regions. The research questions were answered, and the objective of the study was achieved.

The results indicate that the development of unemployment across the regions of the Czech Republic is not homogeneous but exhibits strong and long-term regional differentiation.

Regions with high unemployment at the beginning of the observed period maintained this status in subsequent years, while economically stronger regions have consistently demonstrated low and stable unemployment. This trend is particularly evident in the Capital City of Prague, as well as in the Plzeň and Central Bohemian regions. The cluster analysis thus identified three groups of regions characterized by different unemployment trends.

The first cluster includes regions with low and stable unemployment, the second cluster consists of regions with a medium and relatively stable level of unemployment, and the third

cluster comprises regions facing persistently high unemployment. Using the selected complementary characteristic—namely the educational structure—it was demonstrated that regions with a higher proportion of tertiary-educated individuals exhibit lower unemployment than regions with lower levels of educational attainment.

The results showed that the educational structure of the population is one of the key factors distinguishing the groups of regions and influencing regional differences in unemployment. Education represents not only an individual advantage but also a regional competitive advantage. It helps shape long-term labor market development and may contribute to reducing regional disparities.

A limitation of this research is that unemployment is influenced by a number of additional factors, such as economic structure or transport accessibility, which could not be included in the analysis. However, these limitations do not diminish the relevance of the findings, which can be considered both valid and valuable. The contribution of this study lies in providing a comprehensive quantitative perspective on regional differences in unemployment over a long time period. The findings may be useful for regional development experts seeking ways to better target support toward structurally disadvantaged regions.

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