# ASSESSING AND STREAMLINING THE POTENTIAL OF THE OPEN BALKANS INITIATIVE

# VOLUME 3
# COUNTRY DISPARITY ANALYSES: CLUSTER ANALYSIS

**Centre for Economic Analyses – CEA**

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**Impresum**

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# About the Project

**CENTRE FOR ECONOMIC ANALYSES (CEA) IS CONDUCTING A ONE-YEAR OSF PROJECT ENTITLED:**
<u>**ASSESSING AND STREAMLINING THE POTENTIAL OF THE OPEN BALKANS INITIATIVE (OBI)**</u>

**BACKGROUND**
Recognising the EU's lack of interest in enlargement towards the Western Balkans, Serbian President Aleksandar Vučić, Prime Minister of North Macedonia Zoran Zaev, and Albanian Prime Minister Edi Rama decided to "take destiny into their own hands" and launch a "mini-Schengen" in October 2019. In July 2021, this idea evolved to become the regional initiative **"Open Balkans[1]".** While the initiative is no substitute for membership in the EU, it provides a path to accelerated membership and the utilisation of existing yet insufficiently used potential in these countries, which might lead to additional economic growth and development and, in turn, welfare for their citizens.
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**CHALLENGES TO KEEP THE MOMENTUM**
Developing and cultivating neighbourly relations in the Western Balkans in expectation of economic prosperity will require that border controls and other barriers be eliminated in order to facilitate the movement of people, goods and services, and capital around the region. Regional disparities analyses (e.g., coastal vs. internal, NUTS 2 and NUTS 3 regions, urban vs. rural, capital cities vs. other cities) of the Open Balkan countries might offer insights while setting priorities for more accelerated growth and internal convergence of the Open Balkans region. **At the moment, there is a lack of properly elaborated analyses to be able to assess the existing challenges.**

The COVID-19 pandemic, the food and energy crises, and the war in Ukraine show the importance of internal cooperation and coordination and the need for mutual understanding and solidarity among Open Balkan countries. Internal coordination and cooperation, exchanges of experiences, and solidarity in the region bring value to future EU integration if the Open Balkan countries can speak with one voice.

**TOOLS AND INSTRUMENTS FOR ASSESSING THE POTENTIAL FOR ACHIEVING COOPERATION AND COORDINATION**
While on the highest political level there is still evidence of political will for the Open Balkans, on the administrative level (or 'on the ground') people cannot really sense the benefits of this initiative just yet. **At the very least, what is missing is more evidence-based policy research on the bottlenecks in cooperation and potential of the six countries of the Open Balkans.**

**ACTIVITIES OF THE PROJECT**
**An independent pool of experts from the six countries diagnosing and investigating the bottlenecks in cooperation and coordination among the Open Balkan countries will add value to the already demonstrated political will for the Open Balkans Initiative, leading to its more structured, priority-focused, and systematic development.**

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[1] By Open Balkans Initiative, we will define the territorial space of six countries of the Western Balkan – WB6: Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Kosovo, and Serbia.

# Introductions

This document illustrates the disparities and similarities within and among the WB6 countries. We analyse the disparities and similarities in the EU's NUTS 2 and NUTS 3 regions depending on the data available. The idea is that, given the OBI MoUs and the OBI Agreements and the EU's freedom of movement, some regions of the WB6 countries may be more similar than others. Thus, those NUTS regions that are converging towards a certain cluster, e.g., are showing similarities in some demographic attributes and/or some socio-economic attributes might be a platform for the more efficient implementation of the EU's freedom of movement and the objectives of the OBI MoUs and OBI Agreements. Yet, this does not mean that regions with larger disparities cannot achieve the same objectives. It simply demonstrates that for more similar regions the policies might be implemented more efficiently because they face similar challenges. Those regions that reveal more disparities will need probably greater resources to reach convergence and fewer inequalities. We believe this information is important for policymakers to bring welfare to the citizens of the WB6 countries.

**Volume 1 of Task 2 presents a summary of the country reports prepared by the experts. Volume 2 of Task 2 presents the economic view of the territorial challenges, needs and potential, while this text, Volume 3 of Task 2, presents cluster analysis of the NUTS 3 regions (where data were available).**

Our country experts took a neutral stance and unbiased approach as they conducted the data collection and analysis for this research task. Irrespective of their particular stance on the OBI, whether informed criticism or support for the initiative, their opinion did not affect the data collection process or the data analysis in the sense of favouring, disregarding, or encouraging one answer or outcome over others.

Among the WB6 countries, three are members of the OBI, and three have been invited to become members, but have not done so yet. Therefore, this analysis is conducted separately for the member countries (Albania, North Macedonia, Serbia) and for the non-member countries (Bosnia and Herzegovina, Kosovo, Montenegro). The OBI countries from the Western Balkans (Albania, North Macedonia, Serbia) are defined for the purpose of understanding in this document as **"participating"** and the countries from the Western Balkans that are not part of the OBI (Bosnia and Herzegovina, Kosovo, Montenegro) will be defined for that purpose as **"not participating"**.

In terms of **methodology**, the analysis is performed first by presenting the regional organisation of each country (NUTS 2 and NUTS 3 levels). The regional initiatives each country is participating in are listed along with some characteristics. Then we present which data were collected. The data collection depends on the characteristics of the OBI MoUs and OBI Agreements. Next presented are the disparities and similarities on the NUTS 3 level revealed by the data and, finally, the results of cluster analysis of the collected data. Conclusions follow.

# Data and limitations

The similarity of the regions in the Western Balkan countries is observed using cluster analysis on the NUTS 3 level of disaggregation, navigating certain segments of Western Balkan economies using one or more indicators for each segment in order for the analysis to be as comprehensive as possible.

Note that adding other indicators or using different indicators could produce somewhat different results either with respect to the composition of clusters or the number of clusters. However, given that clustering works on a dataset level where every point is assessed relative to the others, data must be as complete as possible, which somewhat limited the choice and number of indicators to be used. Nevertheless, the composite dataset with eight indicators and all segments taken into account should minimise any potential bias.

Namely, not all countries have data on the NUTS 3 level, i.e., the data for Montenegro are on the national level (NUTS 1) while for Bosnia and Herzegovina they are on the NUTS 2 level. For the remaining countries, although data are available on the NUTS 3 level, certain indicators for Kosovo and Albania are missing. Table 1 in the Annex presents all the indicators used in the cluster analysis and their availability by country.

All indicators (except for area) represent certain ratios and hence wherever possible Montenegro and Bosnia and Herzegovina are included in the analysis. Moreover, in cases when more than one indicator is used to perform clustering or the observed indicators are significantly different in statistical terms, they were standardised, therefore attributing similar importance to them[2].

An important factor that could affect the results is that the analysed indicators represent a snapshot at a certain point in time (1 year), whereby most indicators are flows and the most recent available data are used. This is crucial when considering recent global shocks like the pandemic and its effects, the war in Ukraine, the energy crisis and the surge in inflation. Although these shocks have affected every country in the region, the countries were affected differently, depending on the structure of their economy, fiscal space, and overall capacity to deal with the impact. Further, in an attempt to provide the most comprehensive set of NUTS 3 level data possible, not all indicators represent the same year even during the collection.

# Methodology

Cluster analysis is a multivariate statistical method for processing data.[3] It works by organising subjects into groups (or clusters) based on how closely associated they are o a certain group of indicators or particular segment of the economy. Therefore, the objective of the cluster analysis is to find similar groups of subjects, in this case NUTS 3 level entities, implying that subjects are separated into groups such that each subject is more similar to other subjects in its group than to subjects outside the group.

Unlike many other statistical methods, cluster analysis is typically used when there is no assumption made about the likely relationships within the data. It provides information about

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[2] By standardization here we mean: Using standardization data points are normalized across the same scale, i.e., the resulting score is the standard deviation of a data point from the average. This means that a negative score indicates that the value is lower than the mean and a positive score indicates that the value is higher than the mean, therefore two or more indicators with different scales are comparable and compatible.

[3] Consult the following literature (textbook) for more details: Multivariate Statistical Methods: A Primer (Fourth Edition) by Bryan F.J. Manly and Jorge A. Navarro Alberto, 2016

where associations and patterns in data exist, but not what they might be or what they mean. For instance, we would use cluster analysis to determine whether different geographical areas are linked with high or low levels of unemployment, and thus we could investigate possible local factors contributing to this issue.

Clustering is measured using intra-cluster and inter-cluster distance. Intra-cluster distance is the distance between the data points inside the cluster, whereby if a strong clustering effect is present this should be small (more homogenous). Inter-cluster distance is the distance between data points in different clusters, where it should be large (more heterogeneous) if strong clustering exists. Therefore, a good clustering method should produce high-quality clusters with high intra-class similarity and low inter-class similarity.

Cluster analysis is performed using the K-Means algorithm in the EViews software. K-Means belongs to the group of Partitioning algorithms, establishing the presence of clusters by finding their centroid points. A centroid point is the average of all data points in the cluster. By iteratively assessing the Euclidean distance between each point in the dataset, each one can be assigned to a cluster. The centroid points are random to begin with and change each time as the process is carried out. K-means is commonly used in cluster analysis, but one limitation is that it is mainly useful for scalar data, which is the case with the dataset we are using.

A weakness of this approach is that the number of clusters (k) must be specified in advance. However, we shall manage these weaknesses by consequently increasing the number of clusters and observing certain statistical measures, such as variance, standard deviation and/or coefficient of variation within clusters, in order to reach the optimal number of clusters.

# Cluster analysis

Cluster analysis is first performed for each segment using indicators at hand, which were accordingly transformed such that wherever possible Bosnia and Herzegovina (NUTS 2) and Montenegro (NUTS 1) were appropriately included in the analysis. The final step was putting it all together by selecting one (or two) indicator for each segment, where the indicators were standardised.

➢ **Area**

Although observing the area of regions alone is of limited relevance for this analysis, it is an important starting point. This indicator is indirectly used in segments such as demography and infrastructure. Using only the NUTS 3 level of data, the analysis shows that an appropriate number of clusters would be 6. The next chart presents the distribution by cluster. Two entities can be treated as outliers with territories scoring about twice the overall average, placed in cluster 6. Most entities gravitate to clusters 2 and 3.

Chart 1. Distribution by cluster of the Area indicator
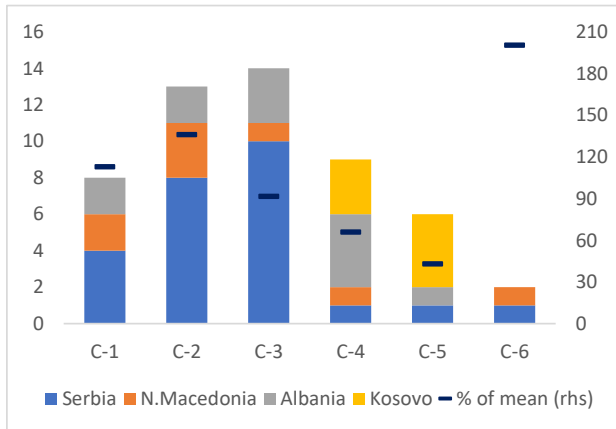
Source: Own calculations.

## ➢ Demography

Three indicators are used in this segment in order to perform clustering: population density (population relative to the area of each entity), age dependency rate (population aged up to 14 and older than 64 relative to the population aged 15 to 64) and rate of natural increase (number of births less number of deaths per thousand inhabitants). Data for Bosnia and Herzegovina and Montenegro are also included, and all indicators are standardised.

The scatterplot (Chart 2.2) shows that the relationship of these variables is complex since the association between the rate of natural increase and population density is generally positive, whereas the association between the natural increase rate and age dependency rate, as well as between population density and age dependency rate, is negative. Yet, it is obvious that certain clusters emerge.

Chart 2.1/2.2 Distribution by cluster (left) and scatterplot (right) of the Demography indicators
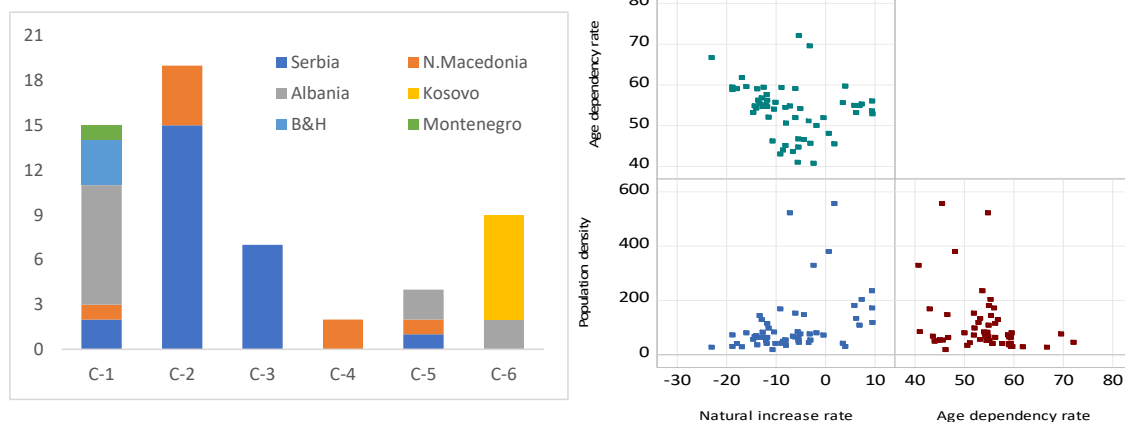


Source: Own calculations.

Simulations show that an appropriate number of clusters would be 6. Entities with the largest population density level, observed in three NUTS 3 capital cities (Belgrade, Skopje, Tirana) and Durres of NUTS 3, are grouped in cluster 5. Cluster 4 consists of two entities, exhibiting the highest rate of age dependency. Note that this two-entity cluster also appears when 5 and 7 are the total number of clusters specified. Cluster 3 is characterised by a high (two-digit) level of the negative natural increase rate and low population density level, as opposed to cluster 6 where entities exhibit positive natural increase rates, as well as an above-average level of

population density in general. Another cluster with a relatively high level of negative natural increase rate is cluster 2 towards which most of the entities gravitate overall (19), and individually for Serbia and North Macedonia, with below-average levels of population density generally. Entities with low levels of the age dependency rate, which also exhibit negative natural increase rates that are around the average, are grouped in cluster 1.

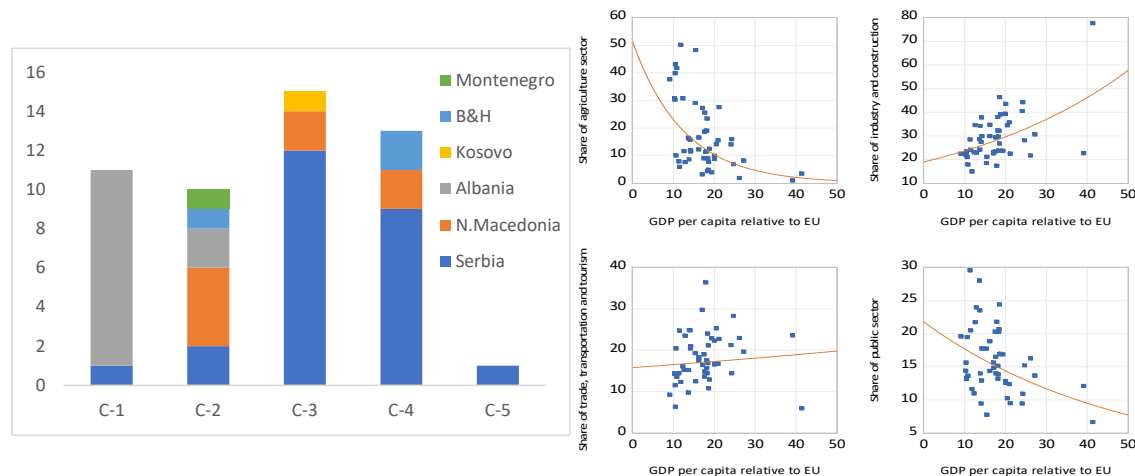> ## Economy

Cluster analysis for this segment is performed using five indicators, i.e., GDP per capita as a ratio of the average EU level and the structure of the gross value added[4], whereby the following sectors were considered: agriculture, industry (including construction), trade, transportation and tourism activities, and public sector, all presented in percent.

The importance and relationship of the observed sectors against GDP per capita for the observed entities are presented in Chart 3.2. Note that data for Kosovo were not available on a disaggregated level and therefore in this segment Kosovo was included on the national level, like the case for Montenegro. Bosnia and Herzegovina is included as well (NUTS 2). Standardised data were used to perform the clustering. The scatterplot shows that, in general, the GDP level is negatively associated with the share of agriculture and the public sector, whereas the industrial sector (including construction) and to a smaller extent trade, transportation and tourism activities tend to be positively associated with the level of GDP within the observed entities.

Chart 3.1/3.2 Distribution by cluster (left) and scatterplot (right) of the Economy indicators



Source: Own calculations.

Simulations show that five clusters (including the outlier) are sufficient to structure the entities into meaningful groups. Hence, cluster 1 is characterised by agriculture's large share in economic activity, twice the average share of all entities, coupled with a low level of GDP per capita, as well as the low participation of the other analysed sectors in the economy. Entities with the biggest GDP per capita level overall, observed in three capital cities and Montenegro as a whole, are grouped in cluster 2 that is associated with the high participation of trade, transportation and tourism in GDP. Industrial and construction activity dominate in cluster 3, which is also accompanied by an above-average level of GDP per capita in general. Cluster 4, having a below-average level of GDP per capita overall, is characterised by the public sector's

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[4] Gross value added is the gross domestic product minus net taxes on products.

large share in economic activity and around the average participation of trade, transportation and tourism. Cluster 5 consists of one entity, exhibiting the highest level of GDP per capita (2.4 times the average) and the strongest participation of the industrial and construction sectors. Note that this cluster appears also when 6 and 7 are the total number of clusters specified.

> ## Business entities

Cluster analysis for this segment is performed using two indicators: enterprise births and enterprise deaths relative to (one thousand) active enterprises. Indicators showing the structure of enterprises by size were dropped given that more than 90% of active enterprises in each entity are micro and small, with the average being around 96%, whereas less than 1% of enterprises are large. Since the data are stated in relative terms, Bosnia and Herzegovina and Kosovo are included as well, available on the NUTS 2[5] and NUTS 1 levels, respectively, and were not standardised, while data for Montenegro were not available for these two indicators. The scatterplot (Chart 4.2) shows that the enterprises death ratio is generally associated with the enterprises birth ratio, although some entities face a negative net birth ratio.

Chart 4.1/4.2 Distribution by cluster (left) and scatterplot (right) of the Business entity indicators
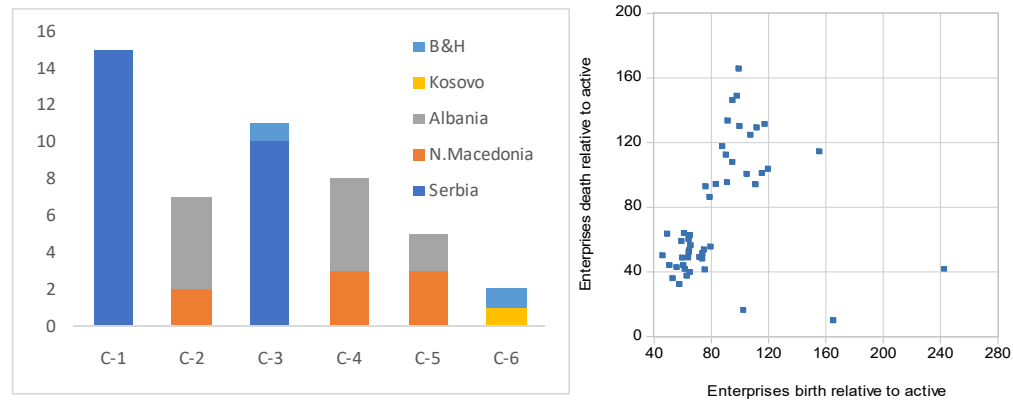


Source: Own calculations.

Simulations show that six clusters capture well the entities scattered based on these indicators. One cluster (C-6) can be treated as an outlier with a disproportionally high level of enterprise births and low level of enterprise deaths, implying a substantial addition to active enterprises. Clusters 2, 4 and 5 entail a combination of entities from North Macedonia and Albania. Clusters 2 and 5 are characterised by a negative net birth enterprise ratio. The entities in cluster 5 exhibit bigger negative gaps, with enterprise death rates being approximately twice the average level, coupled with a slight over-performance regarding enterprise births, while the entities in cluster 2 observe above-average levels of enterprise deaths and around the average levels of enterprise births generally. The entities in cluster 4 seem to show a strong positive association with these indicators, both exceeding the average levels, as opposed to clusters 1 and 3 where these indicators lag behind the average levels. However, the entities in cluster 3 exhibit higher enterprise birth rates and a bigger contribution to the number of active enterprises.

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[5] Only for two entities.

## ➢ Tourism

Cluster analysis for this segment is performed using two indicators pertaining to domestic tourists and two to international ones. The number of domestic and foreign tourists is presented as a ratio to the population of a respective entity (per thousand inhabitants), and nights spent at tourist accommodation establishments are presented relative to the number of tourists, domestic and foreign (nights per hundred tourists). Data for Albania and Montenegro, available on the national level, were not included and as tourist attractions thus do not affect the results. Data for Bosnia and Herzegovina are on the NUTS 2 level and for the other countries on the NUTS 3 level, with all indicators being standardised.

The scatterplot (Chart 5.2) shows that while there is positive association of nights spent between domestic and foreign tourists, there is no clear pattern and there are some outliers while observing the relationship between the number of domestic and foreign tourists for the analysed entities. Despite this, certain clusters emerge.

Chart 5.1/5.2 Distribution by cluster (left) and scatterplot (right) of the Tourism indicators
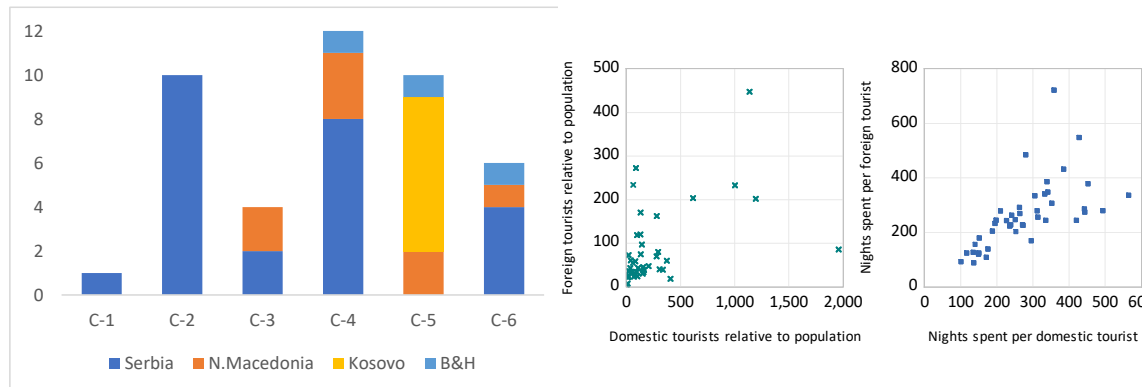


Source: Own calculations.

Simulations show that an appropriate number of clusters would be 6, including the outlier of an entity in Serbia characterised by a disproportionally high relative number of domestic tourists. Other entities (two in Serbia and two in North Macedonia) where domestic tourism is also massive (in terms of both the number of tourists and nights spent), but coupled with strong foreign tourism as well, are grouped in cluster 3. Cluster 2, which is homogenous country-wise, shows over-performance in results in terms of nights spent by domestic and foreign tourists, but below-average levels of tourists overall. Entities that lag significantly behind (in terms of tourists and nights spent) regarding both domestic and foreign tourism are placed in cluster 5, and those that lag slightly behind are placed in cluster 4, relative to the average levels. Cluster 6, to which the capital cities of three countries belong, is characterised by a large number of foreign tourists who stay relatively shorter periods (below- average), but under-performs as regards domestic tourists.

## ➢ Infrastructure

For this segment, only asphalt roads were used as an indicator of group entities, which was the most complete country-wise. It is presented relative to area in hundred km, whereby data for Kosovo and Montenegro are on the national level. The analysis shows that an appropriate number of clusters would be 6 with one outlier, namely the capital city of Serbia, exhibiting a value close to 5 times the average level of the observed entities. Chart 6 shows the distribution by cluster and the average value of each cluster relative to the total average. Most entities (17)

gravitate to cluster 6, which is also the most diverse country-wise, but significantly below the average level of asphalt roads, as is the case with cluster 4 as well, which is a concern and indicates that infrastructure is an area that these two clusters should focus on and address.

Chart 6. Distribution by cluster of the Infrastructure indicator
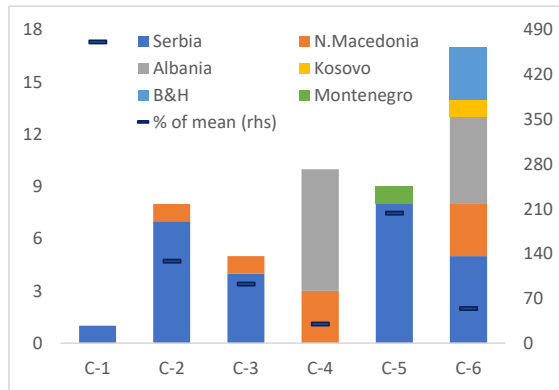


Source: Own calculations.

> ➢  **Labour market**

While trying to group entities based on labour market performances, four indicators were considered: activity rate, employment and unemployment rate and the average monthly gross[6] wage in euros. Nonetheless, given that the activity rate and employment rate showed a strong positive correlation, it was decided to drop the employment rate. The relationship between the three indicators used is presented in Chart 7.2, while Chart 7.1 displays the number of entities by cluster and country. Note that data for Kosovo were not available on a disaggregated level and hence in this segment Kosovo was included on the national level, like the case for Montenegro. Bosnia and Herzegovina is included as well (NUTS 2). Standardised data were used to perform the clustering.

Chart 7.1/7.2 Distribution by cluster (left) and scatterplot (right) of the Labour market indicators
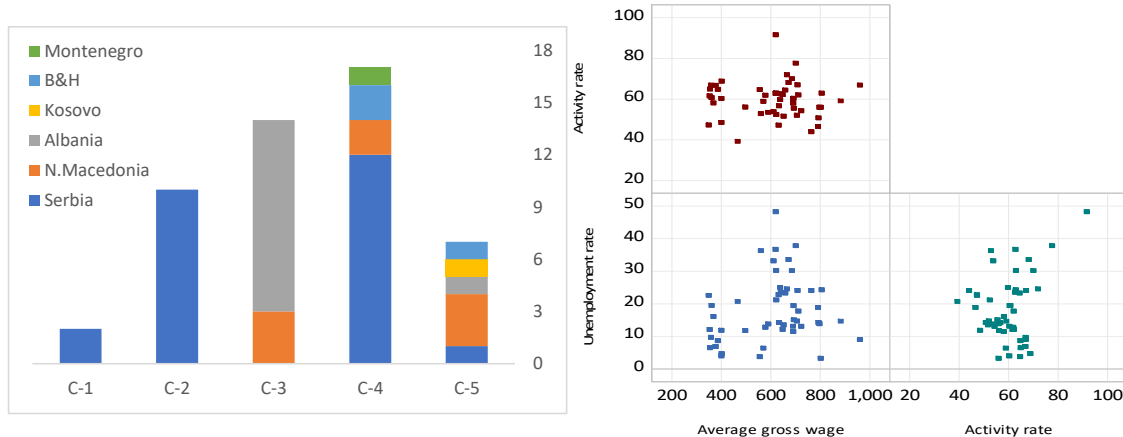


Source: Own calculations.

The data indicate that five clusters (including the outlier) are sufficient to structure entities into meaningful groups. Cluster 4, towards which most of the entities (17) gravitate, including the

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[6] Although the average net wage would be more appropriate indicator, the lack of data imposed using data for wages in gross terms.

capital cities of countries that form part of this cluster, is characterised by a below-average level of unemployment that is associated with a high level of wages. Low unemployment rates are also characteristic of entities in cluster 3, with activity rates around the average in general, but unlike in cluster 4 wages are much lower, respectively 30% below the average level. Entities that are worse off in terms of the unemployment rate are grouped in clusters 2 and 5, with the difference being that the entities in cluster 5 exhibit low levels of activity rate and wages, while the entities in cluster 2, being homogeneous country-wise, are better off in terms of wages and activity rates (above the average). Cluster 1, with two entities exhibiting very high unemployment rates (more than twice the average level), but also above-average levels of activity and wages, can be treated as an outlier.

## ➢ Education

Cluster analysis for this segment is performed using two indicators: pupils in primary education and pupils in secondary education, relative to population (per thousand inhabitants). Since the data are expressed in relative terms, Bosnia and Herzegovina and Montenegro are included as well, available on the NUTS 2 and NUTS 1 levels, respectively, and were not standardised. The scatterplot (Chart 8.2) reveals there is no association between these two indicators up to a certain point (number of pupils in primary schools), after which there is a strong positive correlation, but for only a few observations.

Chart 8.1/8.2 Distribution by cluster (left) and scatterplot (right) of the Education indicators
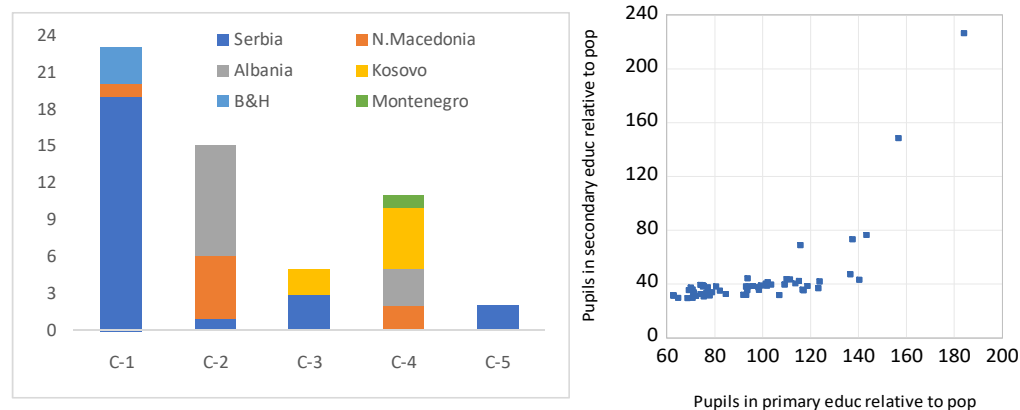


Source: Own calculations.

Simulations show that an appropriate number of clusters would be 5, including an outlier (cluster 5), consisting of two big cities in Serbia where the number of pupils in secondary education is disproportionally high compared to the number of pupils in primary education, which could be a sign of the low level of dispersion of high schools across the country. Cluster 1, consisting of about 40% of observed entities, is characterised by a below-average level of pupils in both primary and secondary education, as opposed to cluster 3 where entities proportionally show above-average levels of pupils overall. Clusters 2 and 4 show under-performing results with regard to pupils in secondary schools, where the difference is that the entities in cluster 4 have over-performing results with respect to pupils in primary schools, while those in cluster 2 have average results in general.

## ➢ Putting it all together (composite clustering)

While trying to combine certain indicators from different segments, several scenarios were considered. It was vital to include all countries on the level of disaggregation for which data were available. Therefore, eight indicators were selected, where for entities for which there was no data for a certain indicator (21 out of 56) the application allowed them to be included in the clustering process, which affected the results somewhat.

Although far from perfect, this provides a good basis for further analysis of the disparities/similarities of the countries on the regional level overall. Indicators that were included were: natural increase rate, GDP per capita relative to the EU, net enterprises births relative to active enterprises, total tourists relative to the population, asphalt roads relative to the area, unemployment rate, average gross wage, and pupils in primary and secondary education relative to the population.

The number of clusters is specified as 6, considering that 6 was the most common number of clusters in the segments analysed. Chart 9 shows the distribution of entities by cluster.

Chart 9. Distribution by cluster of selected indicators
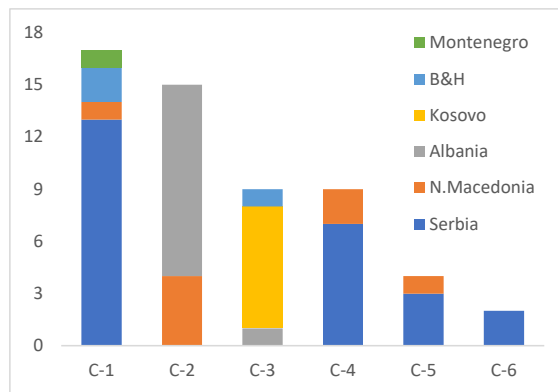


Source: Own calculations.

# Conclusion

The similarity of regions in the Western Balkan countries was observed using cluster analysis on the NUTS 3 level of disaggregation (where data were available), navigating certain segments of Western Balkan economies using one or more indicators for each segment. Cluster analysis is a multivariate statistical method for processing data that works by organising subjects into groups based on how closely associated they are in relation to certain indicators. The objective was to find similar subjects, in this case NUTS 3 level entities, and to separate them into groups such that each entity is more similar to others in its group than to those outside the group.

The results obtained for each segment should provide a good basis for more in-depth research of similarities in the region on a disaggregated level and for economic policies to achieve overall economic progress as a region.

Below, we present a few aspects revealed by the cluster analysis. For instance, the analysis based on demographic indicators identifies a cluster with a high negative natural increase rate and low population density level and a cluster with entities that exhibit positive natural increase rates as well as an above- average population density in general. This could help determine common factors that have led to the situations described.

In addition, the analysis based on economic activity indicators shows a cluster in which entities show a large share of agriculture in the economy have a low GDP per capita level, as well as the low participation of other analysed sectors in GDP. On the other hand, entities with the biggest GDP per capita level overall, as observed in the capital cities of Serbia, North Macedonia and Albania, as well as Montenegro as a whole, are associated with trade, transportation and tourism's high participation in GDP. Another cluster shows that entities in which industrial and construction activity dominate generally have an above-average level of GDP per capita. These findings may be an important consideration while devising economic policies on the regional level.

Analysis of the tourism data shows that a certain cluster, to which the capital cities of Serbia, North Macedonia and Bosnia and Herzegovina belong, is characterised by a large number of foreign tourists who stay relatively shorter periods, which could be important information concerning tourism and its development. As regards the aspect of infrastructure, most entities gravitate to the cluster that is the most diverse country-wise and significantly below the average level of asphalt roads, which is a concern and indicates that infrastructure is an area that the countries in the region should focus on and address.

With respect to education indicators, cluster analysis identified two big cities in Serbia as outliers, where the number of pupils in secondary education was disproportionally high relative to the number of pupils in primary education, which could be a sign of the low level of dispersion of high schools across the country.

# Annex 1. Indicators used for the cluster analysis

Table 1. Indicators by area of interest and their availability

| segments and indicators | AL | BH | KS | MK | MN | SR |
|---|---|---|---|---|---|---|
| **I.        TERRITORY – 1. Area** | NUTS 3 | NUTS 2 | NUTS 3 | NUTS 3 | NUTS 1 | NUTS 3 |
| **II.        DEMOGRAPHY** | NUTS 3 | NUTS 2 | NUTS 3 | NUTS 3 | NUTS 1 | NUTS 3 |
| **2. Population density** | | | | | | |
| **3. Age dependency rate** | | | | | | |
| **4. Natural increase rate** | | | | | | |
| **III.        ECONOMY** | NUTS 3 | NUTS 2 | NUTS 1 | NUTS 3 | NUTS 1 | NUTS 3 |
| **5. GDP per capita relative to the EU** | | | | | | |
| **6. Share of agriculture sector** | | | | | | |
| **7. Share of industry and construction** | | | | | | |
| **8. Share of trade, transportation and tourism** | | | | | | |
| **9. Share of public sector** | | | | | | |
| **IV.        BUSINESS ENTITIES** | NUTS 3 | NUTS 2* | NUTS 1* | NUTS 3 | NUTS 1* | NUTS 3 |
| **10. Enterprise births relative to active enterprises** | | | | | | |
| **11. Enterprise deaths relative to active enterprises** | | | | | | |
| **12. Share of micro and small enterprises** | | | | | | |
| **13. Share of large enterprises** | | | | | | |
| **V.        TOURISM** | NUTS 1 | NUTS 2 | NUTS 3 | NUTS 3 | NUTS 1 | NUTS 3 |
| **14. Domestic tourists relative to the population** | | | | | | |
| **15. Foreign tourists relative to the population** | | | | | | |
| **16. Nights spent per domestic tourist** | | | | | | |
| **17. Nights spent per foreign tourist** | | | | | | |
| **VI.        INFRASTRUCTURE** | NUTS 3 | NUTS 2 | NUTS 1 | NUTS 3 | NUTS 1 | NUTS 3 |
| **18. Asphalt roads relative to the area** | | | | | | |
| **VII. LABOUR MARKET** | NUTS 3 | NUTS 2 | NUTS 1 | NUTS 3 | NUTS 1 | NUTS 3 |
| **19. Activity rate** | | | | | | |
| **20. Employment rate** | | | | | | |
| **21. Unemployment rate** | | | | | | |
| **22. Average gross wage** | | | | | | |
| **VIII. EDUCATION** | NUTS 3 | NUTS 2 | NUTS 3 | NUTS 3 | NUTS 1 | NUTS 3 |
| **23. Pupils in primary education relative to the population** | | | | | | |
| **24. Pupils in secondary education relative to the population** | | | | | | |

* Partial data

# Annex 2. Clusters and findings by area of interest

Table 2. Summary of indicators, clusters and findings by area of interest (the yellow highlight are selected clusters for which maps are illustrated)

| Area of interest | Indicators | Cluster | Entities by country | | | | | | | Features |
| | | | SR | MK | AL | KS | BH | MN | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| DEMOGRAPHY | - Population density<br>- Age dependency rate<br>- Natural increase rate | C-1 | 2 | 1 | 8 | 0 | 3 | 1 | 15 | Low levels of age dependency rate and negative natural increase rates that are around the average |
| | | C-2 | 15 | 4 | 0 | 0 | 0 | 0 | 19 | A relatively high negative natural increase rate and below-average levels of population density in general. |
| | | C-3 | 7 | 0 | 0 | 0 | 0 | 0 | 7 | High (two-digit) negative natural increase rate and low population density |
| | | C-4 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | Highest rate of age dependency |
| | | C-5 | 1 | 1 | 2 | 0 | 0 | 0 | 4 | Highest population density (capital cities) |
| | | C-6 | 0 | 0 | 2 | 7 | 0 | 0 | 9 | Positive natural increase rates and an above-average population density in general |
| ECONOMY | - GDP per capita relative to the EU<br>- Share of the agriculture sector<br>- Share of industry and construction<br>- Share of trade, transportation and tourism<br>- Share of the public sector | C-1 | 1 | 0 | 10 | 0 | 0 | 0 | 11 | A large share of agriculture in economic activity and a low level of GDP per capita |
| | | C-2 | 2 | 4 | 2 | 0 | 1 | 1 | 10 | The largest GDP per capita level overall (three capital cities and Montenegro) and high participation of trade, transportation and tourism in GDP |
| | | C-3 | 12 | 2 | 0 | 1 | 0 | 0 | 15 | Industrial and construction activity dominate coupled with an above-average level of GDP per capita. |
| | | C-4 | 9 | 2 | 0 | 0 | 2 | 0 | 13 | A below-average level of GDP per capita, the public sector's large share in economic activity, and around the average participation of trade, transportation and tourism in GDP |
| | | C-5 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | An outlier exhibiting the largest level of GDP per capita (2.4 times the average) and the highest participation of the industrial and construction sector in GDP. |
| BUSINESS ENTITIES | - Enterprises birth relative to active enterprises<br>- Enterprises death relative to active enterprises | C-1 | 15 | 0 | 0 | 0 | 0 | / | 15 | Increase in the number of active enterprises generally, coupled with below-average levels of enterprise births and deaths |
| | | C-2 | 0 | 2 | 5 | 0 | 0 | / | 7 | A smaller negative net birth enterprise ratio, with above-average levels of enterprise deaths |

| Area of interest | Indicators | Cluster | Entities by country | | | | | | | Features |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | SR | MK | AL | KS | BH | MN | Total | |
| | | C-3 | 10 | 0 | 0 | 0 | 1 | / | 11 | A higher increase in the number of active enterprises, with higher enterprise birth rates than death rates, both being below the average |
| | | C-4 | 0 | 3 | 5 | 0 | 0 | / | 8 | A strong positive association between these indicators, with both exceeding the average levels |
| | | C-5 | 0 | 3 | 2 | 0 | 0 | / | 5 | A larger negative net birth enterprise ratio, with enterprise death rates being approximately twice the average level, coupled with a slightly above-average enterprise birth ratio |
| | | C-6 | 0 | 0 | 0 | 1 | 1 | / | 2 | An outlier with a disproportionally high level of enterprise births and low level of enterprise deaths |
| TOURISM | - Domestic tourists relative to the population <br> - Foreign tourists relative to the population <br> - Nights spent per domestic tourist <br> - Nights spent per foreign tourist | C-1 | 1 | 0 | / | 0 | 0 | / | 1 | An outlier characterised by a disproportionally high relative number of domestic tourists |
| | | C-2 | 10 | 0 | / | 0 | 0 | / | 10 | Over-performing results in terms of nights spent by domestic and foreign tourists, but below-average levels of tourists overall |
| | | C-3 | 2 | 2 | / | 0 | 0 | / | 4 | Domestic tourism is massive, also coupled with strong foreign tourism |
| | | C-4 | 8 | 3 | / | 0 | 1 | / | 12 | Lagging slightly behind, mostly in terms of the number of tourists |
| | | C-5 | 0 | 2 | / | 7 | 1 | / | 10 | Lagging significantly behind in both domestic and foreign tourism |
| | | C-6 | 4 | 1 | / | 0 | 1 | / | 6 | A large number of foreign tourists who stay relatively shorter periods (below-average), but under-performing as regards domestic tourists (capital cities) |
| INFRASTRUCTURE | - Asphalt roads relative to the area | C-1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | An outlier (capital city) exhibiting a value close to 5 times the average level of all entities |
| | | C-2 | 7 | 1 | 0 | 0 | 0 | 0 | 8 | A somewhat above-average length of asphalt roads |
| | | C-3 | 4 | 1 | 0 | 0 | 0 | 0 | 5 | Around the average level |
| | | C-4 | 0 | 3 | 7 | 0 | 0 | 0 | 10 | Significantly below the average level |
| | | C-5 | 8 | 0 | 0 | 0 | 0 | 1 | 9 | Significantly above the average level |
| | | C-6 | 5 | 3 | 5 | 1 | 3 | 0 | 17 | Considerably below the average length of asphalt roads |

| Area of interest | Indicators | Cluster | Entities by country | | | | | | | Features |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | SR | MK | AL | KS | BH | MN | Total | |
| LABOUR MARKET | - Activity rate<br>- Unemployment rate<br>- Average gross wage | C-1 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | An outlier exhibiting very high unemployment rates, but also above-average levels of activity and wages |
| | | C-2 | 10 | 0 | 0 | 0 | 0 | 0 | 10 | Worse off in terms of the unemployment rate, but better off in terms of wages and activity rates (above the average) |
| | | C-3 | 0 | 3 | 11 | 0 | 0 | 0 | 14 | Low unemployment rates, with activity rates around the average in general and low wages |
| | | C-4 | 12 | 2 | 0 | 0 | 2 | 1 | 17 | A below-average level of unemployment rate associated with a high level of wages (capital cities) |
| | | C-5 | 1 | 3 | 1 | 1 | 1 | 0 | 7 | Worse off in terms of the unemployment rate with low levels of activity rate and wages |
| EDUCATION | - Pupils in primary education relative to the population<br>- Pupils in secondary education relative to the population | C-1 | 19 | 1 | 0 | 0 | 3 | 0 | 23 | A below-average level of pupils in both primary and secondary education |
| | | C-2 | 1 | 5 | 9 | 0 | 0 | 0 | 15 | Average results as regards pupils in primary schools, but under-performing results regarding pupils in secondary schools |
| | | C-3 | 3 | 0 | 0 | 2 | 0 | 0 | 5 | Proportionally above-average levels of pupils overall |
| | | C-4 | 0 | 2 | 3 | 5 | 0 | 1 | 11 | Over-performing results with respect to pupils in primary schools, but under-performing results regarding pupils in secondary schools |
| | | C-5 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | An outlier where the number of pupils in secondary education is disproportionally high relative to the number of pupils in primary education |

# Annex 3. Maps with illustration of selected clusters

**Demography (Population density; Age dependency rate; Natural increase rate)**
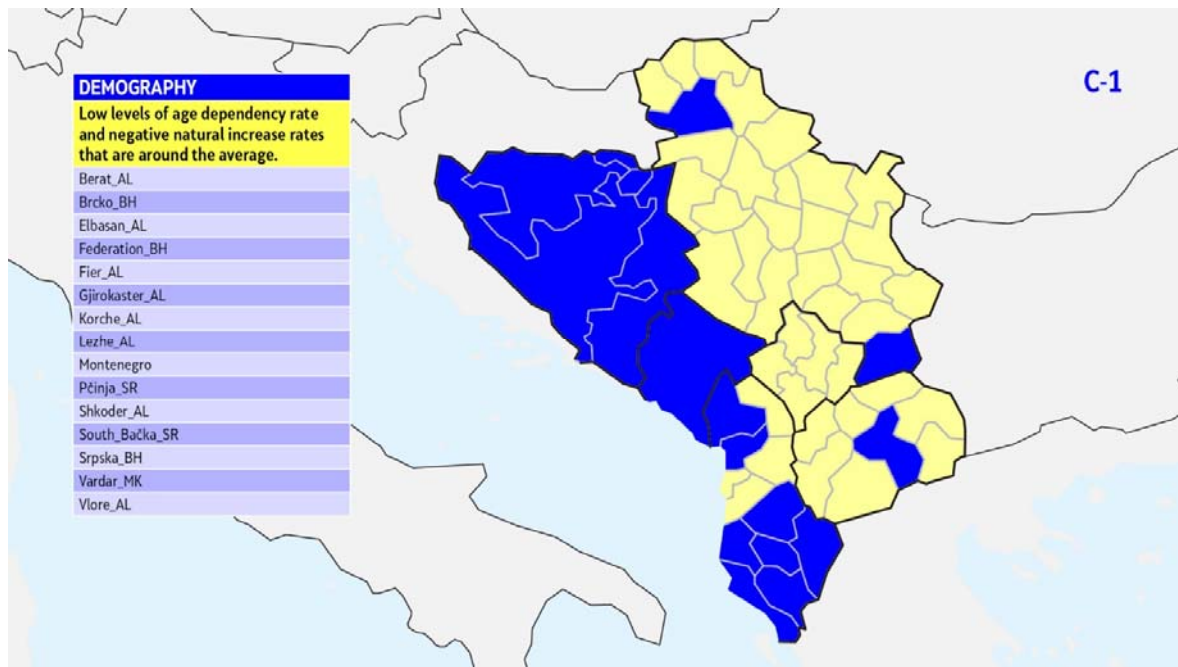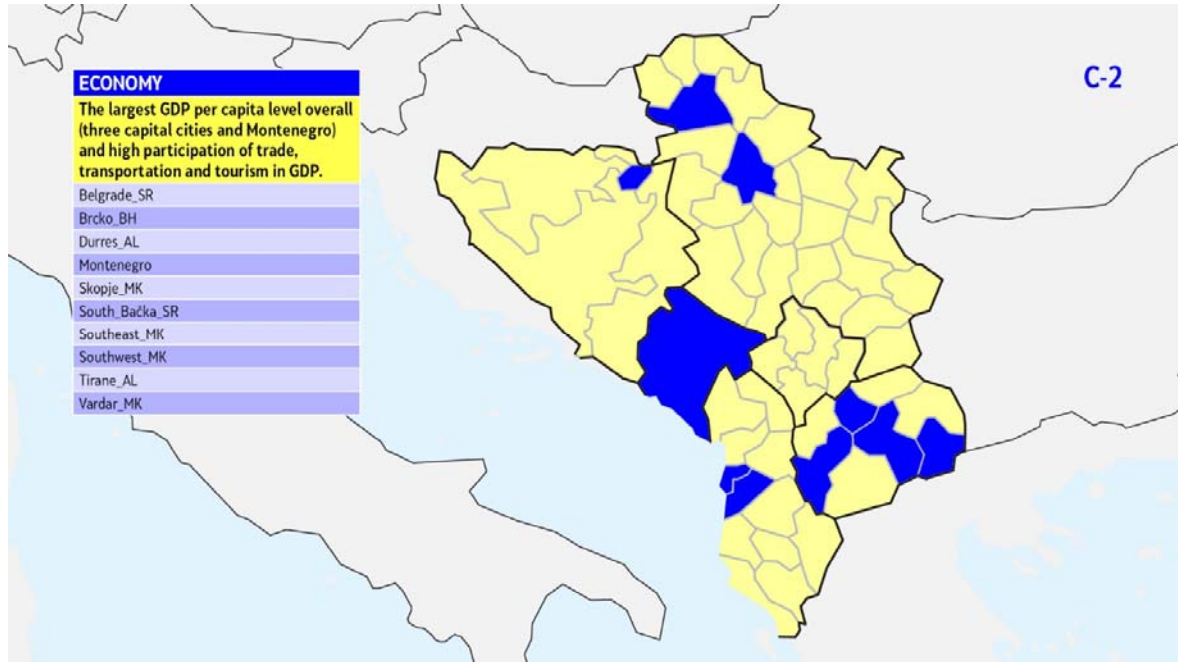


Low levels of age dependency rate and negative natural increase rates that are around the average



A relatively high negative natural increase rate and below-average levels of population density in general.

**Economy (GDP per capita relative to the EU; Share of the agriculture sector; Share of industry and construction; Share of trade, transportation and tourism; Share of the public sector)**



ECONOMY

The largest GDP per capita level overall (three capital cities and Montenegro) and high participation of trade, transportation and tourism in GDP.

Belgrade_SR
Brcko_BH
Durres_AL
Montenegro
Skopje_MK
South_Bačka_SR
Southeast_MK
Southwest_MK
Tirane_AL
Vardar_MK

C-2

The largest GDP per capita level overall (three capital cities and Montenegro) and high participation of trade, transportation and tourism in GDP



ECONOMY

A below-average level of GDP per capita, the public sector's large share in economic activity, and around the average participation of trade, transportation and tourism in GDP.

Federation_BH
Jablanica_SR
Niš_SR
Northeast_MK
Pčinja_SR
Podunavlje_SR
Polog_MK
Pomoravlje_SR
Raška_SR
Srpska_BH
Šumadija_SR
Toplica_SR
Zaječar_SR

C-4

A below-average level of GDP per capita, the public sector's large share in economic activity, and around the average participation of trade, transportation and tourism in GDP

**Business entities (Enterprises birth relative to active enterprises; Enterprises death relative to active enterprises)**



**BUSINESS ENTITIES**
Increase in the number of active enterprises generally, coupled with below-average levels of enterprise births and deaths.

- Bor_SR
- Jablanica_SR
- Kolubara_SR
- Mačva_SR
- North_Bačka_SR
- North_Banat_SR
- Pčinja_SR
- Pirot_SR
- Podunavlje_SR
- Pomoravlje_SR
- Rasina_SR
- South_Banat_SR
- Šumadija_SR
- West_Backa_SR
- Zaječar_SR

C-1

Increase in the number of active enterprises generally, coupled with below-average levels of enterprise births and deaths
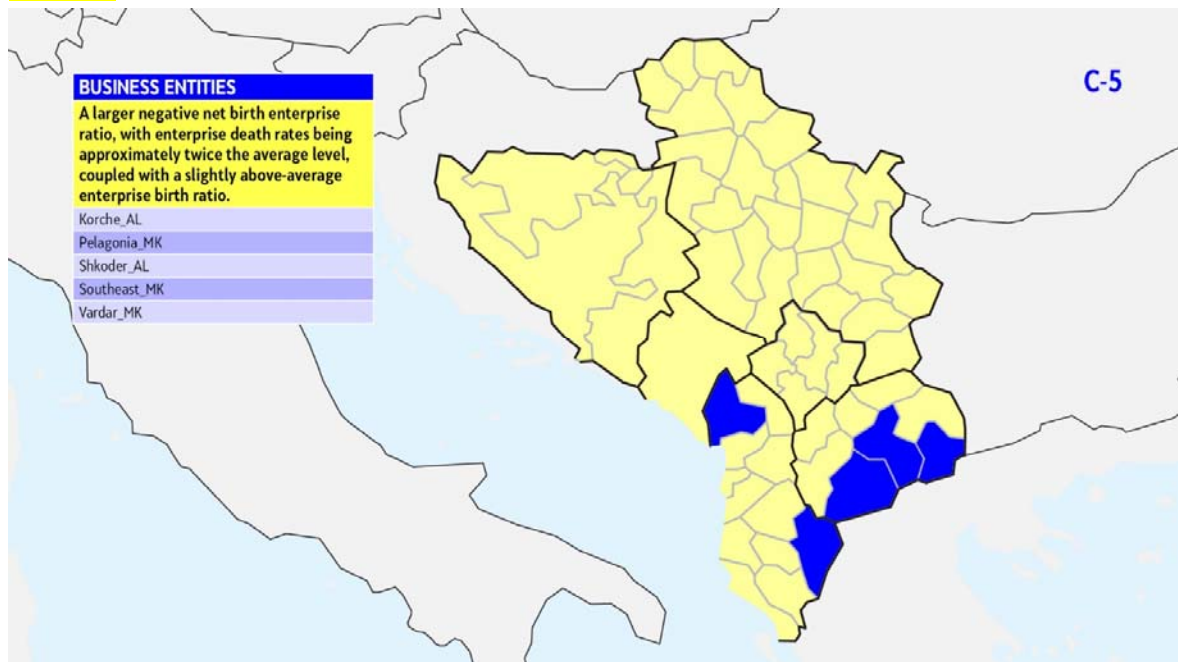


**BUSINESS ENTITIES**
A larger negative net birth enterprise ratio, with enterprise death rates being approximately twice the average level, coupled with a slightly above-average enterprise birth ratio.

- Korche_AL
- Pelagonia_MK
- Shkoder_AL
- Southeast_MK
- Vardar_MK

C-5
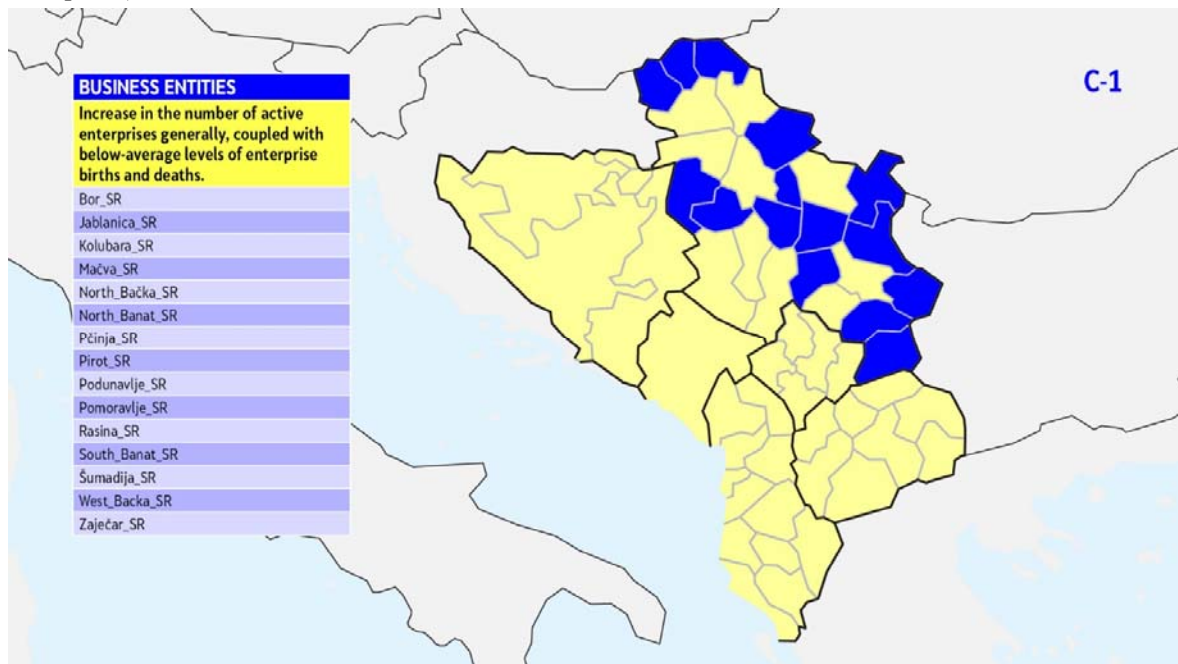
A larger negative net birth enterprise ratio, with enterprise death rates being approximately twice the average level, coupled with a slightly above-average enterprise birth ratio

**Tourism (Domestic tourists relative to the population; Foreign tourists relative to the population; Nights spent per domestic tourist; Nights spent per foreign tourist)**



TOURISM

Domestic tourism is massive, also coupled with strong foreign tourism.

Raška_SR
Southeast_MK
Southwest_MK
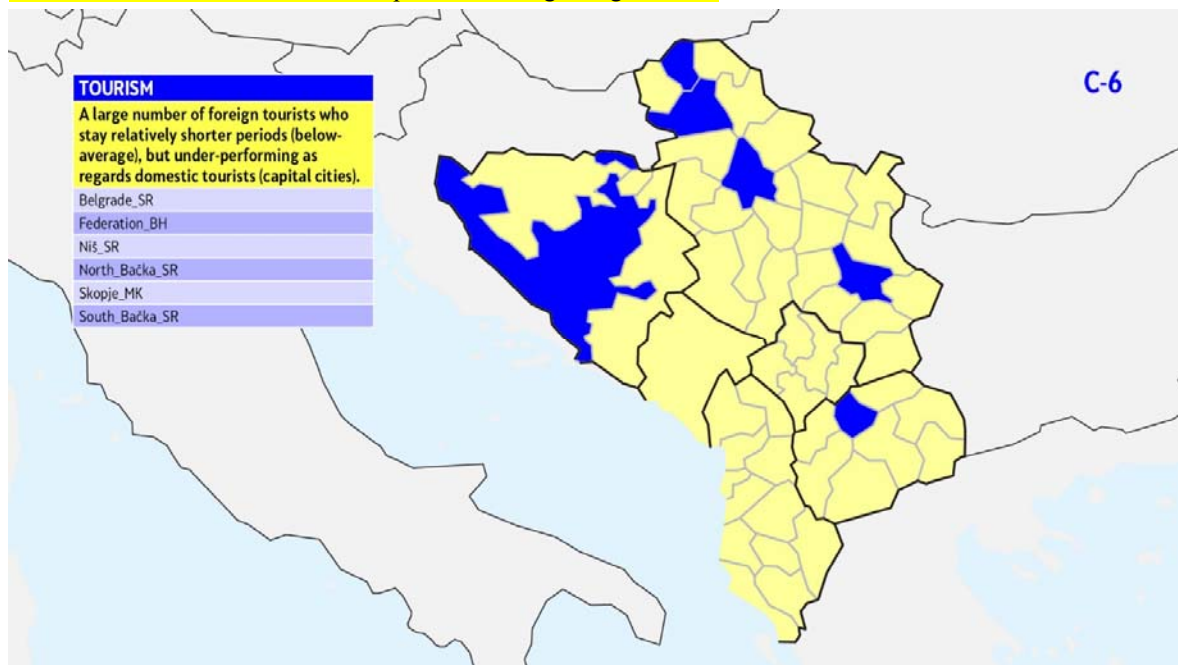Zlatibor_SR

C-3
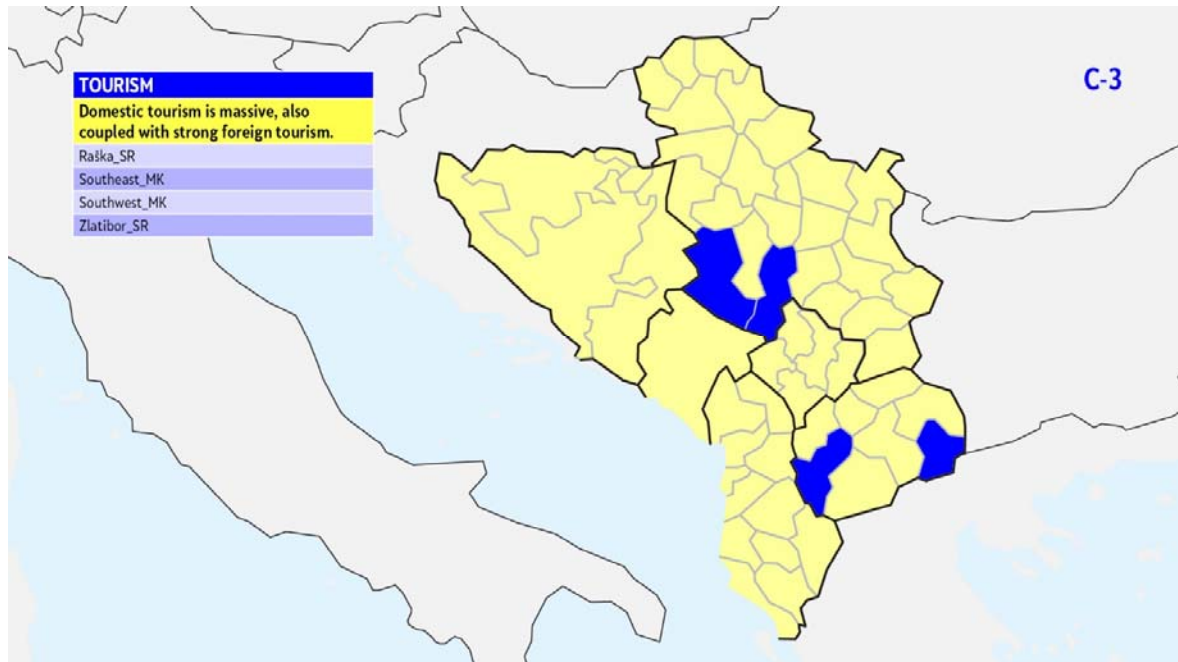
Domestic tourism is massive, also coupled with strong foreign tourism



TOURISM

A large number of foreign tourists who stay relatively shorter periods (below-average), but under-performing as regards domestic tourists (capital cities).

Belgrade_SR
Federation_BH
Niš_SR
North_Bačka_SR
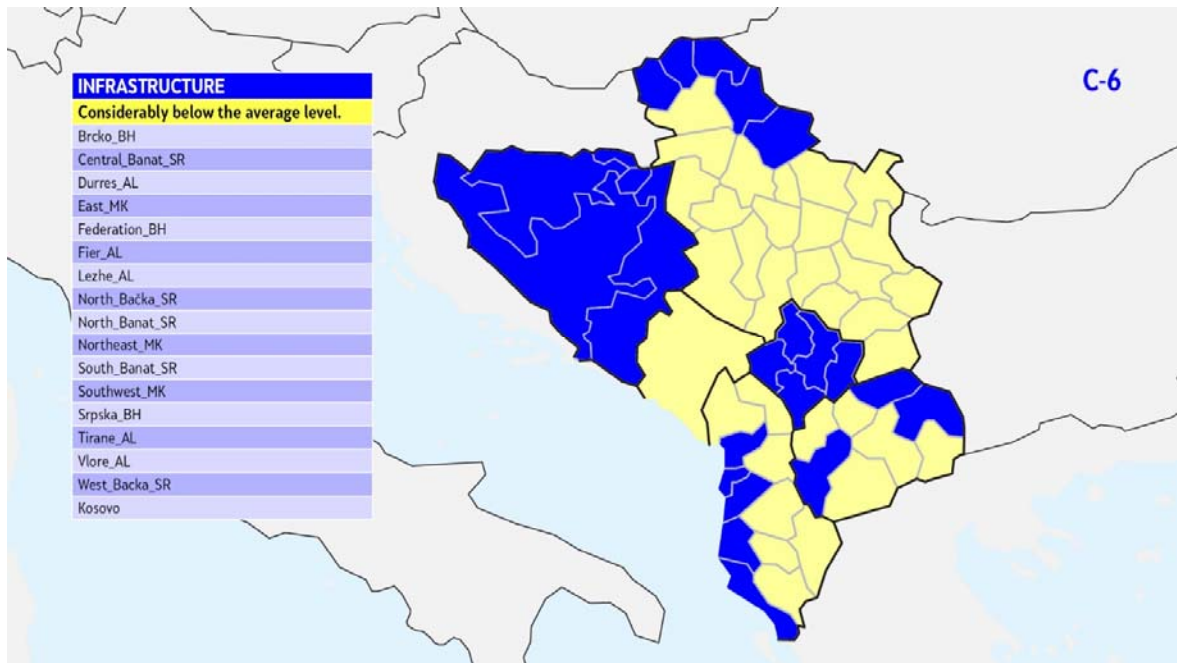Skopje_MK
South_Bačka_SR

C-6

A large number of foreign tourists who stay relatively shorter periods (below-average), but under-performing as regards domestic tourists (capital cities)

**Infrastructure (Asphalt roads relative to the area)**



INFRASTRUCTURE
A somewhat above-average length of asphalt roads.
Bor_SR
Braničevo_SR
Moravica_SR
Niš_SR
Podunavlje_SR
Pomoravlje_SR
Skopje_MK
Toplica_SR

A somewhat above-average length of asphalt roads



INFRASTRUCTURE
Considerably below the average level.
Brcko_BH
Central_Banat_SR
Durres_AL
East_MK
Federation_BH
Fier_AL
Lezhe_AL
North_Bačka_SR
North_Banat_SR
Northeast_MK
South_Banat_SR
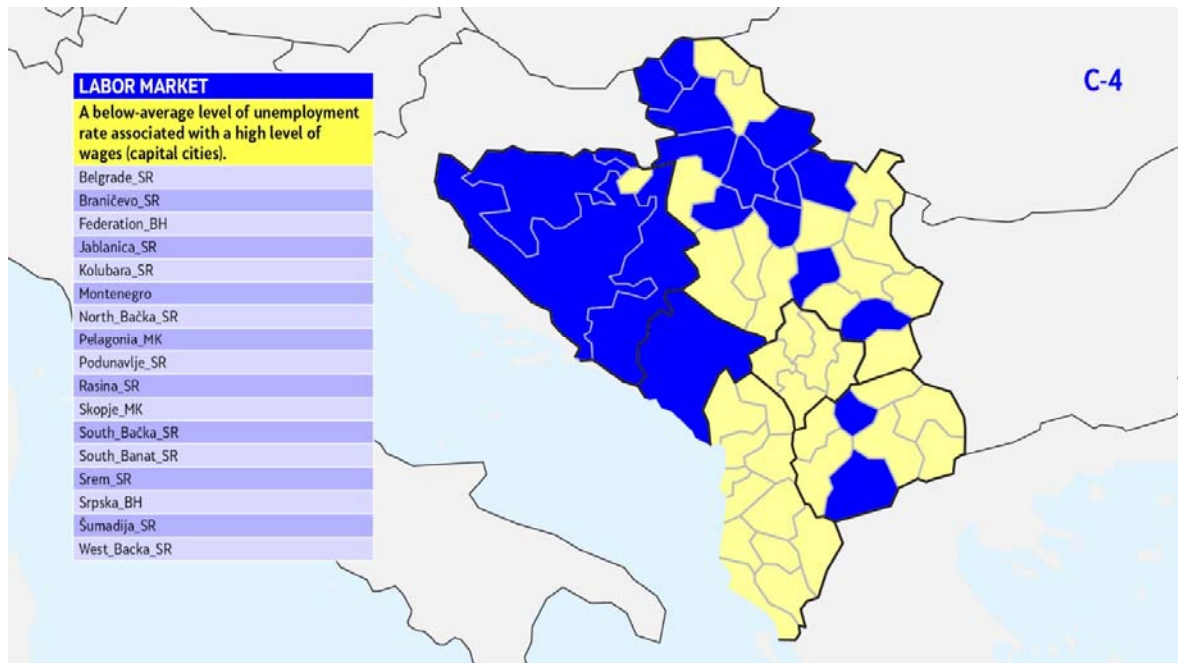Southwest_MK
Srpska_BH
Tirane_AL
Vlore_AL
West_Backa_SR
Kosovo
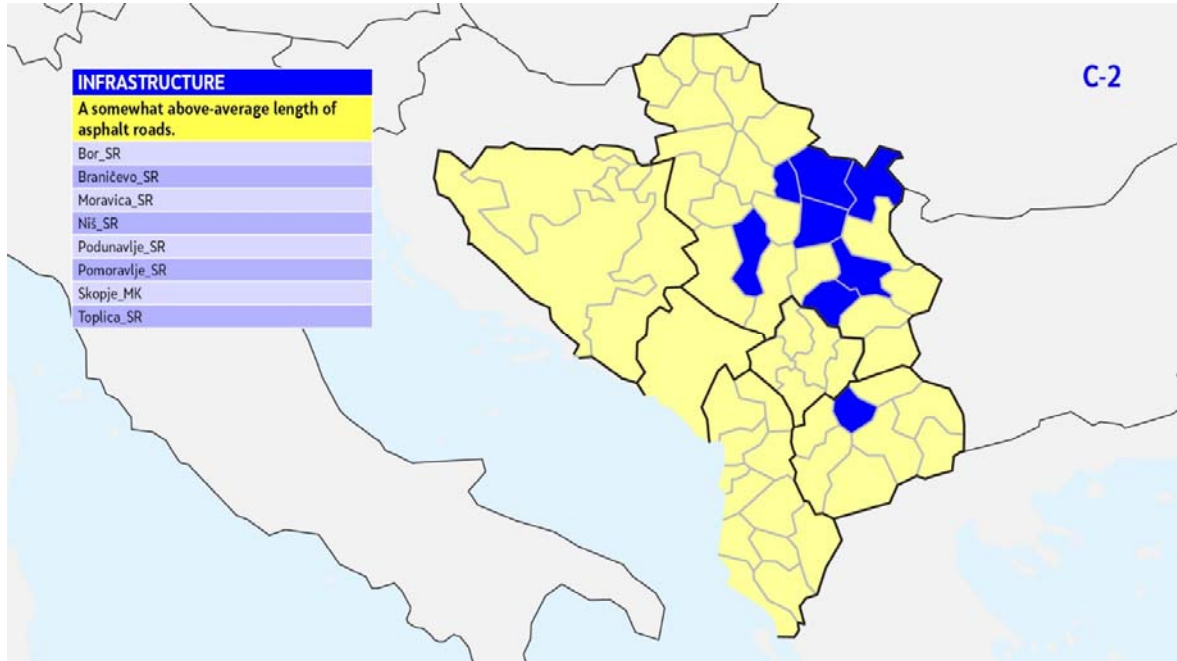
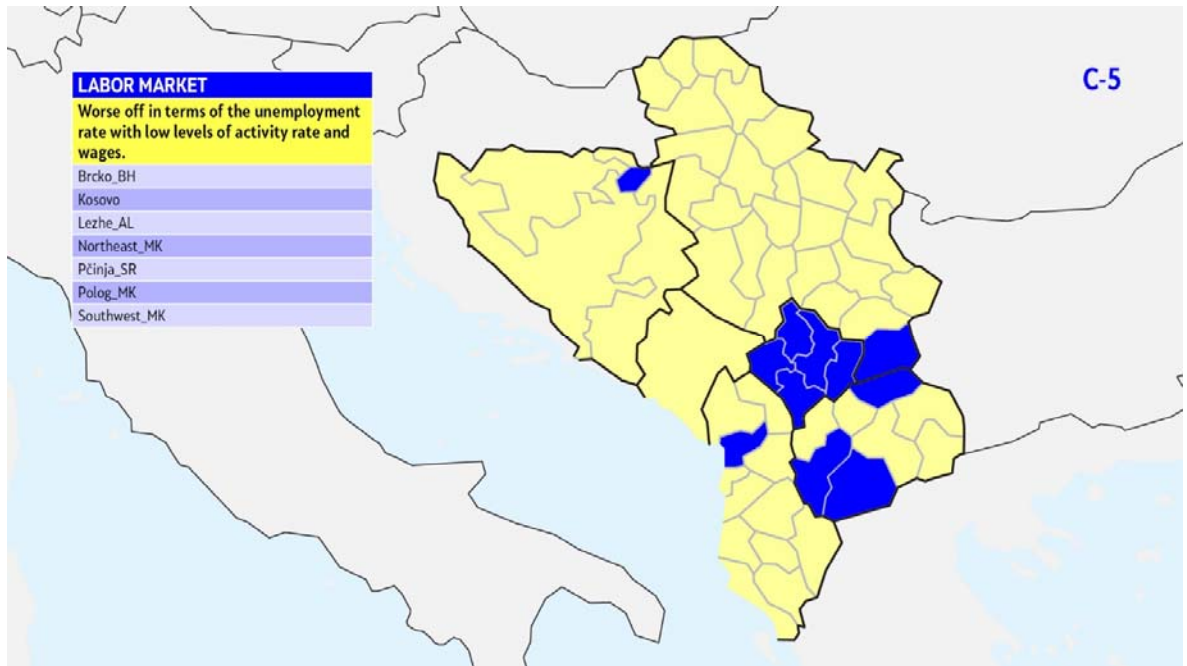Considerably below the average length of asphalt roads

**Labor market (Activity rate; Unemployment rate; Average gross wage)**



**LABOR MARKET**
Low unemployment rates, with activity rates around the average in general and low wages.
Berat_AL
Diber_AL
Durres_AL
EAST_MK
Elbasan_AL
Fier_AL
Gjirokaster_AL
Korche_AL
Kukes_AL
Shkoder_AL
Southeast_MK
Tirane_AL
Vardar_MK
Vlore_AL

C-3

Low unemployment rates, with activity rates around the average in general and low wages



**LABOR MARKET**
A below-average level of unemployment rate associated with a high level of wages (capital cities).
Belgrade_SR
Braničevo_SR
Federation_BH
Jablanica_SR
Kolubara_SR
Montenegro
North_Bačka_SR
Pelagonia_MK
Podunavlje_SR
Rasina_SR
Skopje_MK
South_Bačka_SR
South_Banat_SR
Srem_SR
Srpska_BH
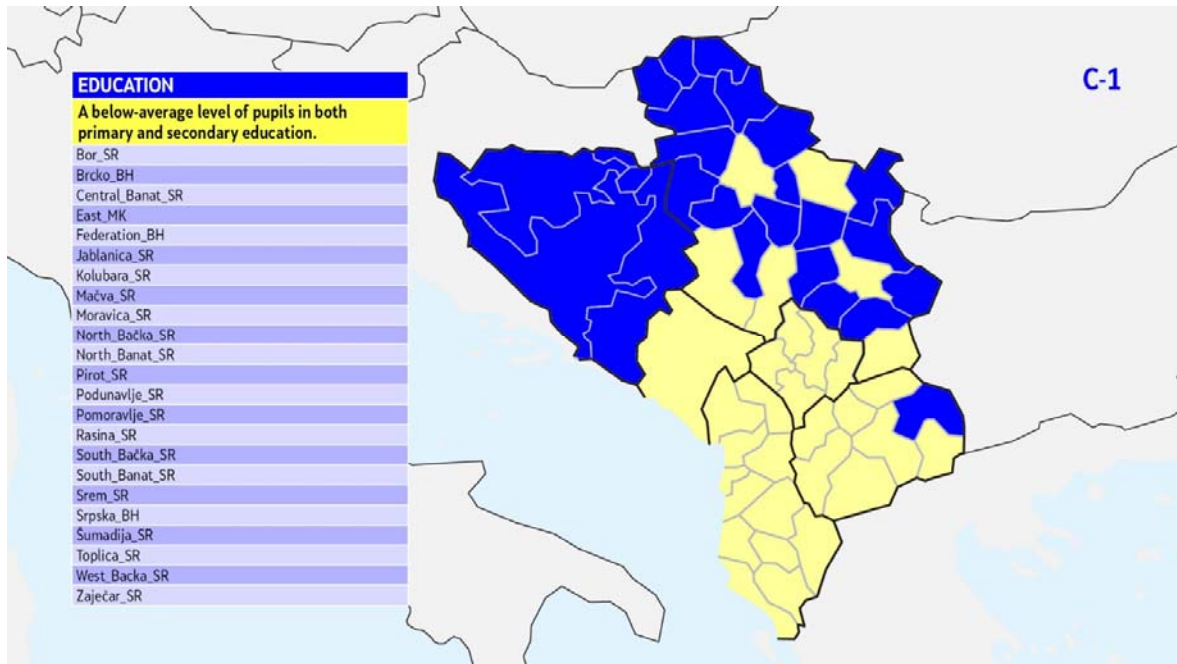Šumadija_SR
West_Backa_SR

C-4

A below-average level of unemployment rate associated with a high level of wages (capital cities)

**LABOR MARKET**

Worse off in terms of the unemployment rate with low levels of activity rate and wages.

Brcko_BH
Kosovo
Lezhe_AL
Northeast_MK
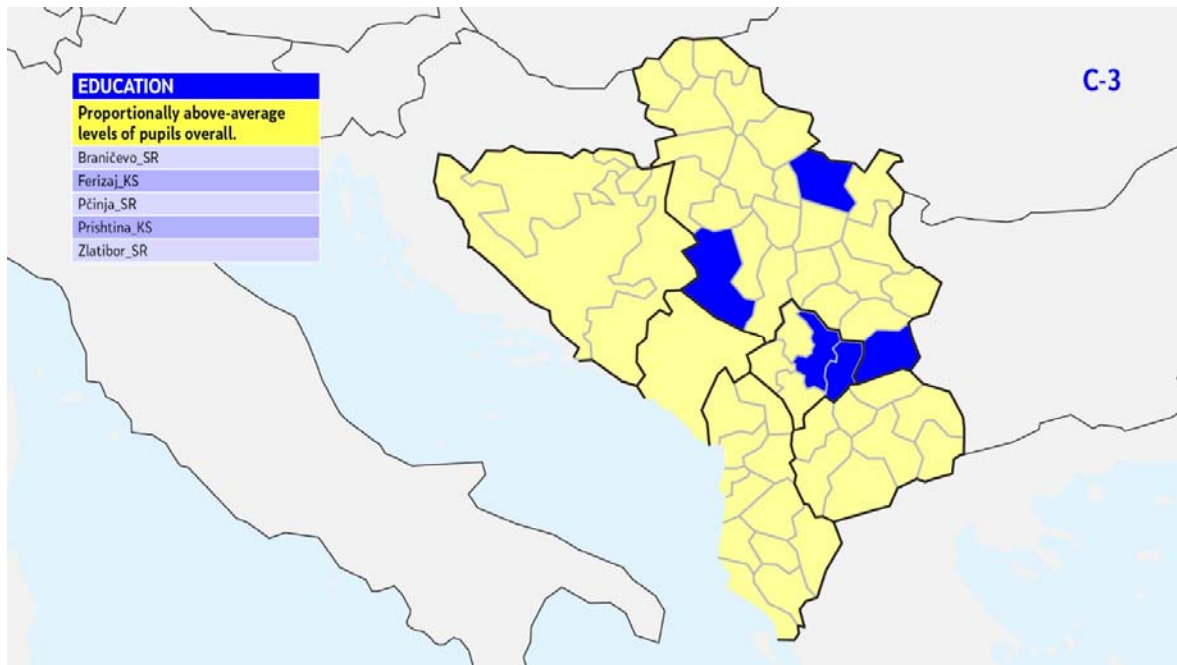Pčinja_SR
Polog_MK
Southwest_MK

C-5

Worse off in terms of the unemployment rate with low levels of activity rate and wages

**Education (Pupils in primary education relative to the population; Pupils in secondary education relative to the population)**



EDUCATION

A below-average level of pupils in both primary and secondary education.

Bor_SR
Brcko_BH
Central_Banat_SR
East_MK
Federation_BH
Jablanica_SR
Kolubara_SR
Mačva_SR
Moravica_SR
North_Bačka_SR
North_Banat_SR
Pirot_SR
Podunavlje_SR
Pomoravlje_SR
Rasina_SR
South_Bačka_SR
South_Banat_SR
Srem_SR
Srpska_BH
Šumadija_SR
Toplica_SR
West_Backa_SR
Zaječar_SR

C-1

A below-average level of pupils in both primary and secondary education



EDUCATION

Proportionally above-average levels of pupils overall.

Braničevo_SR
Ferizaj_KS
Pčinja_SR
Prishtina_KS
Zlatibor_SR

C-3

Proportionally above-average levels of pupils overall