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Spatial Disparities in Economic Structural Change in Central and Eastern Europe During Integration

Understanding the structural change in catching-up regions and the spatial distribution of economic sectors is essential for designing comprehensive policy strategies to promote balanced economic development. This study examines the economic restructuring of the 11 central and eastern European EU member states as they catch up with the more developed EU14. The study applies productivity metrics and the Theil index to assess geographical concentrations and explore spatial patterns of centre-(semi)periphery features. The results reveal significant structural changes in central and eastern European economies, with variations across different region types. The diversity of economic sectors in central and eastern European countries differs markedly from that in the EU14, influenced by market- and policy-related factors. Addressing these inequalities requires targeted efforts to mitigate territorial disparities in the age of twin transition challenges and geopolitical conflicts.

Studying economic structural changes, especially in regions striving to catch up, distinguishing their development trajectories and characterising sectoral spatial concentrations is key to developing comprehensive strategies that promote balanced economic growth. This process involves understanding development trajectories and sectoral spatial concentrations. Todaro and Smith (2020) offer valuable insights, highlighting four paradigms of economic development: the linear-stages-of-growth model, structural change theories, the international de-

pendence revolution and the neoclassical, free-market counter-revolution. These paradigms emphasise the importance of transforming economic structures, particularly shifting resources from low-productivity to high-productivity sectors (McMillan et al., 2017). This aligns with the European Union's regional policy, which aims to reduce economic disparities, enhance effective structural changes and foster convergence regions (Alcidi, 2019; Chakraborty & Mandel, 2024).

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Analysing central and eastern European countries is crucial for understanding their economic restructuring and development trajectories, which can inform EU regional policies aimed at reducing disparities and promoting spatial inclusive growth. Following the market liberalisation (after 1990) and EU accession (2004, 2007, 2013), these countries have been modernising and integrating their economies, with foreign direct investment (FDI) playing a key role (Capello & Perucca, 2015; Lengyel et al., 2017). Additionally, substantial European funding, including allocations from the Cohesion Fund, has been directed towards the region with clearly defined goals and practices (Gorzela, 2021).

The economic integration brought significant structural changes, though the impacts were uneven across regions due to factors such as proximity to western Europe, industrialisation patterns, urbanisation, and local cultural and creative assets. Urban-rural polarisation has also emerged as a key issue in recent years, prompting further analysis of urbanisation at the European level (Annoni et al., 2019; Bodnár, 2021). Moreover, during the period of

regional convergence after 2010, one of the key elements was the issue of reindustrialisation in more rural areas, alongside the concentration of the service sector in metropolitan regions (Vas et al., 2024).

Reindustrialisation, discussed in literature since the 1990s (Cristopherson et al., 2014), gained importance in EU policies after the 2008 crisis (European Commission, 2021). Nonetheless, factors like globalisation, modernisation, technological changes, economies of scale, supply chain expansion, increasing importance of services, etc. also contributed to deindustrialisation (Cristopherson et al., 2014; Wolman et al., 2015). In the European Union, calls for economic transformation focused on industrial transition or reindustrialisation (Cimoli et al., 2015; Landesman, 2015). These efforts are supported by policy frameworks such as “An Integrated Industrial Policy for the Globalisation Era” (COM (2010) 0614) and the “European Industrial Renaissance” (COM (2014) 14 final), the latter aiming to increase the share of manufacturing from 15% to 20%. Alongside the industrial transition, regions have also adopted smart specialisation strategies (European Commission, 2021).

Central and eastern European countries have prioritised reindustrialisation by encouraging foreign investments, offering incentives and fostering favourable institutional conditions (Nagy et al., 2021). This reindustrialisation coincides with Industry 4.0 and reflects a division between the EU’s advanced western regions and less developed central and eastern ones, where activities with low added value dominate (Kiss & Páger, 2023). These regions must focus on transitioning to knowledge-based economies, enhancing productivity and business sophistication (Dobrzański et al., 2024).

Currently, the European Union faces many significant challenges in economic competitiveness in the age of the twin transition and geopolitical conflicts (Draghi, 2024; European Commission, 2024). However, if the change is not appropriately managed by the European Union’s cohesion policy, a “regional development trap” may emerge, hindering Europe’s economic dynamism (Diemer et al., 2022). Additionally, it is crucial to analyse spatial disparities, as spatial inequalities can lead to serious political consequences (Rodríguez-Pose, 2018; Dobrzański et al., 2024; Wolf, 2024).

Our research examines the structural changes in the NUTS3 regions of 11 central and eastern EU member states (CEE11): Bulgaria, Czechia, Estonia, Croatia, Poland, Latvia, Lithuania, Hungary, Romania, Slovakia and Slovenia, to understand their development trajectories and explore the spatial concentration of industries. We

address three key questions: How did economic restructuring and productivity growth in CEE11 NUTS3 regions compare to the EU14 from 2010 to 2020? Are CEE11 regions converging with EU14 regions in terms of productivity? Which regions had the highest concentration of the key manufacturing and business service sectors between 2010 and 2020?

The article first outlines the methodology, including the distinction between urban and rural spaces. It then presents the results using descriptive statistics and Theil indices based on location quotients. Finally, the study concludes with a summary and policy recommendations.

Delimitation, data and methodology

In our study, we analyse the catching-up of the CEE11 countries’ 239 NUTS3 regions with the EU14, focusing on their economic restructuring between 2010 and 2020. Due to regional boundary changes in some countries, comparable data on gross value added (GVA) and employment at the NUTS3 level is only available from 2010. We use annual data from seven sector groups for each region based on EU typologies. For comparison, we evaluate the economic structure of the 898 NUTS3 regions in the EU14.

In the EU, comparative regional studies typically focus on NUTS2 regions, with statistical offices primarily providing data at this level (Dauderstädt, 2021; Chakraborty & Mandel, 2024). However, spatial peculiarities have shown more detailed trends at the NUTS3 level. Eurostat has categorised the NUTS3 regions based on 1 km² cells and refined them with urban cluster data (cells neighbouring each other), balancing statistical reporting and spatial concentration. Eurostat (2018, p. 74) defines three types for regions corresponding to NUTS3 regions:

- Predominantly urban region (URB): NUTS level 3 regions where more than 80% of the population live in urban clusters;
- Intermediate region (INT): NUTS level 3 regions where more than 50% and up to 80% of the population live in urban clusters;
- Predominantly rural region (RUR): NUTS level 3 regions where at least 50% of the population live in rural grid cells.

Another typology has been developed for NUTS3 regions using the results of grid cells and the delineation of functional urban areas (Eurostat, 2018, p. 83):

- Metropolitan region (INT-M): a single NUTS level 3 region or an aggregation of NUTS level 3 regions in which 50% or more of the population live in a functional urban area that is composed of at least 250,000 inhabitants;

Table 1

Number and population of NUTS3 regions by type in EU14 and CEE11

Type	EU14			CEE11		
	Number of regions	Population, million people		Number of regions	Population, million people	
	2020	2000	2020	2020	2000	2020
CAP	14	27.4	32.1	11	11.9	12.0
URB	192	112.7	123.5	16	9.8	9.9
INT-M	164	56.2	61.6	37	23.7	23.4
INT-N	231	59.3	61.6	66	24.5	22.1
RUR	297	56.1	57.0	109	38.5	35.2
Total	898	311.8	335.8	239	108.5	102.6

Notes: CAP: capital city; URB: predominantly urban region; INT-M: intermediate-metropolitan region; INT-N: intermediate-nonmetropolitan region; RUR: predominantly rural region.

Source: Authors' own calculation based on Eurostat.

- Nonmetropolitan region (INT-N): NUTS level 3 regions that are not metropolitan.

In our study, we combine both typologies to create a hybrid approach. The data is sourced from Eurostat (2018, pp. 116–126).

The regional composition differs between the two country groups, partly due to differences in settlement structures (Table 1). In the CEE11, the population declined from 108.5 million in 2000 to 102.6 million in 2020, driven by emigration and lower birth rates. While population changes in capitals, predominantly urban regions and intermediate-metropolitan regions were minimal, intermediate-nonmetropolitan and rural regions saw significant declines. In contrast, the population of the EU14 grew from 311.8 million in 2000 to 335.8 million in 2020, partly due to immigration from eastern Europe. Thus, the two groups experienced opposite demographic trends. Population distribution is similar for capitals, intermediate-metropolitan and intermediate-nonmetropolitan regions in both groups, but differences are evident in urban and rural regions. In the EU14, 37% live in urban and 17% in rural regions, whereas in the CEE11, only 10% live in urban and 34% in rural regions.

We use seven sector groups from the Eurostat database to analyse the economic structure of region types, with data available for each NUTS3 unit (Table 2). Eurostat provides annual data on employed persons and GVA at current prices for these sectors based on the ESA2010 classification.

Various methodologies measure the spatial concentration of economic activities, typically distinguishing between abso-

Table 2

Analysed sectors and sector groups

Code	NACE activities
A	Agriculture, forestry and fishing
B-D-E	Industry (except manufacturing and construction)
C	Manufacturing
F	Construction
G-H-I-J	Wholesale and retail trade; transport; accommodation and food service activities; information and communication
K-L-M-N	Financial and insurance activities; real estate activities; professional, scientific and technical activities; administrative and support service activities
O-P-Q-R-S-T	Public administration and defence; compulsory social security; education; human health and social work activities; arts, entertainment and recreation, repair of household goods and other services

Source: Authors' own construction based on Eurostat.

lute and relative perspectives (McCann, 2013). In this study, we adopt the framework and methodology of Thissen et al. (2013) to examine the smart specialisation of EU regions. Spatial concentration occurs when companies in a sector cluster in specific areas, deviating from the overall distribution of the economy, while spatial dispersion refers to the opposite.

Thissen et al. (2013) used the normalised Theil index to measure the spatial concentration of industries. Based on entropy, the Theil index reflects the orderliness of the phenomenon, acting as a reversed entropy indicator. To calculate Theil indices for spatial concentration, location quotients (LQs) based on employee numbers and GVA are used:

$$LQ_{ij} = \frac{e_{ij} / \sum_i e_{ij}}{\sum_j e_{ij} / \sum_j e_{ij}} = \frac{s_{ij}}{x_i} = \frac{e_{ij} / E_{.j}}{E_{.i} / E_{..}}$$

where

e_{ij} denotes the number of employees or value of GVA in region i and sector j ; $E_{.j} = \sum_i e_{ij}$ is the number of employees or value of GVA in sector j of the aggregated territory (EU14 or CEE11); $E_{.i} = \sum_j e_{ij}$ is the number of employees or value of GVA in region i ; $E_{..} = \sum_{ij} e_{ij}$ is the number of employees or value of GVA of the whole aggregated territory (EU14 or CEE11); s_{ij} is the share of region i within the number of employees or value of GVA in sector j of the aggregated territory (EU14 or CEE11); x_i is the share of region i within the number of employees or value of GVA of the aggregated territory (EU14 or CEE11).

Based on the calculated LQ values for each year between 2010 and 2020 and each sector or sector group ($j=1, \dots, 7$), a spatial concentration index was computed using the nor-

malised¹ Theil index applied to LQ values (Thissen et al., 2013, pp. 63–64; Lengyel et al., 2017):

$$Conc_j = \left[\frac{1}{I} \frac{1}{\ln(I)} \right] \sum_{i=1}^I \left[\left(\frac{LQ_{ij}}{\sum_{i=1}^I LQ_{ij}} \right) \cdot \ln \left(\frac{LQ_{ij}}{\sum_{i=1}^I LQ_{ij}} \right) \right]$$

where I is the number of regions. The values close to 1 for these indices indicate a high spatial concentration of the respective sector, while values close to 0 suggest a more dispersed distribution.

To measure social and regional inequalities, we use the weighted inverse entropy, a reversed entropy indicator that generalises the Theil index, referred to as the generalised Theil index (GE).

If we have a specific variable (Y_i) expressed as the ratio of two absolute variables (X_i and F_i), then the inequality in the specific variable can be expressed using the generalised Theil index (GE) as follows (Frenken, 2007):

$$GE = \sum_{i=1}^N x_i \log \frac{x_i}{f_i},$$

where x_i and f_i are the distribution ratios formed from the absolute variables. The generalised Theil index measures the inequality among the observed units. The closer it is to 0, the greater the order, indicating more balance.

The generalised Theil index is also suitable for providing an answer, through spatial level aggregation, to how much of the inequality comes from inequalities within and between the aggregated spatial units. In other words, the GE value can be decomposed into the sum of two values (Frenken, 2007):

$$GE = \sum_{i=1}^n x_i \log \frac{x_i}{f_i} = GE_{within} + GE_{between}$$

$$GE_{within} = \sum_{k=1}^m p_k GE_k \quad GE_{between} = \sum_{k=1}^m p_k \log \frac{p_k}{q_k}$$

where GE_{within} is the average of the GE values of the aggregated spatial units (countries or region groups); $GE_{between}$ is the entropy between the aggregated spatial units (countries or region groups); GE_k the entropy within the aggregated spatial unit k (country or region group); p_k and q_k representing the distribution ratios of the absolute variables X and F for the aggregated spatial units (countries or region groups), respectively.

Characteristics of the economic structure of country groups between 2000 and 2020

We analyse the economic structure and transformation of the CEE11 and their regions using two key indicators: em-

¹ The maximum value of the Theil-index is $\ln(I)$. To normalise it onto the interval $[0;1]$, division by $\ln(I)$ was applied.

Table 3
Distribution of hours worked across sectors (%)

Sectors	EU14			CEE11		
	2000	2010	2020	2000	2011	2020
A	5.8	4.5	4.1	20.8	13.7	9.9
B-D-E	1.3	1.3	1.3	3.4	3.1	3.0
C	17.3	13.7	13.1	21.0	19.2	19.6
F	8.6	8.3	7.6	6.3	8.3	8.2
G-H-I-J	28.3	28.8	27.6	23.2	26.0	26.8
K-L-M-N	13.1	15.7	17.3	6.7	9.1	10.4
O-P-Q-R-S-T	25.7	27.7	29.0	18.5	20.6	22.1
Total	100	100	100	100	100	100

Notes: See Table 2 for more details about the analysed sectors.

Source: Authors' own calculation based on Eurostat.

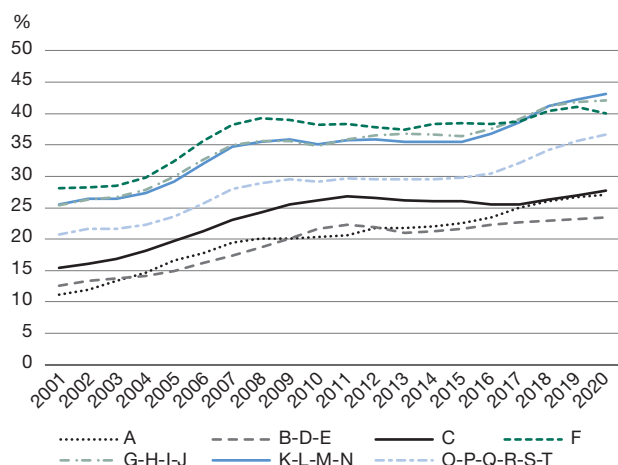
ployment and productivity (GVA per employed person). National data on hours worked and GVA since 2000 are used to calculate productivity for country groups. The sectoral distribution of employees serves as an indicator of economic structure and can be partially aligned with the hours worked. Over the past two decades, both country groups have seen similar trends, though with notable differences (Table 3). For example, the agricultural sector in the CEE11 has declined by half but remains more than twice as large as that of the EU14. In manufacturing, the EU14 experienced a decline due to deindustrialisation, which slowed after 2010 with the EU's reindustrialisation efforts, while the CEE11 saw only a slight decrease and still has a larger manufacturing share. Business services increased in both country groups, but in 2020, their share was over 1.5 times higher in the EU14 than in the CEE11. Services related to households, like trade and accommodation (G-H-I-J and O-P-Q-R-S-T) remain high in both regions.

In four sectors (B-D-E, F, G-H-I-J, O-P-Q-R-S-T), the share of hours worked is similar in both groups, as they align with population distribution and are non-tradeable, while significant differences exist in agriculture, manufacturing and business services.

Productivity, measured by GVA per hour worked, highlights the role of restructuring in the catching-up process of CEE11. For the CEE11 group, productivity improved in each sector, but notable differences compared to EU14 sectoral productivity are observed (Figure 1). From 2000 to 2008, in CEE11, productivity improved across all sectors at a similar rate. After 2015, changes were minimal until 2016, when trends diverged. Business services saw rapid productivity growth, reaching 43% of EU14 levels by 2020. Similarly, sectors like construction and

Figure 1
Sectoral productivity in CEE11 relative to EU14

Gross value added per hour worked



Notes: The figure shows a three-year moving average, which allows for the filtering out of occasional outliers when showing long-term trends. See Table 2 for more details about the analysed sectors.

Source: Authors' own calculation based on Eurostat.

services (G-H-I-J, O-P-Q-R-S-T) also saw gains. However, manufacturing and agriculture sectors, both major employers, saw slower productivity growth, with manufacturing reaching just 28% of EU14 levels by 2020.

Table 4
Share of employed workers in CEE11 and EU14 (%)

		CAP		URB		INT-M		INT-N		RUR	
		2010	2020	2010	2020	2010	2020	2010	2020	2010	2020
A	CEE11	0.8	0.7	2.2	1.8	14.6	9.7	12.3	9.4	27.2	19.7
	EU14	0.4	0.3	1.7	1.4	2.7	2.4	5.2	4.7	8.2	6.9
B-D-E	CEE11	1.8	1.7	5.6	4.7	2.8	2.7	3.4	3.3	2.8	2.8
	EU14	1.1	1.0	1.2	1.2	1.2	1.2	1.4	1.4	1.3	1.4
C	CEE11	10.0	8.7	18.7	18.4	19.9	20.8	24.4	25.9	19.6	21.5
	EU14	6.0	4.9	13.0	11.9	15.4	14.6	17.3	16.7	16.0	16.0
F	CEE11	7.5	6.8	8.2	6.7	8.4	8.5	7.8	7.5	7.2	8.4
	EU14	5.3	4.9	6.2	5.6	6.9	6.5	7.8	6.8	8.0	7.4
G-H-I-J	CEE11	34.5	34.4	28.8	29.4	25.8	27.5	23.5	23.8	19.2	21.5
	EU14	30.6	30.7	28.9	28.8	26.1	26.0	25.6	25.7	24.1	24.4
K-L-M-N	CEE11	20.0	22.5	12.4	14.0	7.7	8.6	6.7	7.3	5.0	5.6
	EU14	23.3	25.1	18.6	19.9	15.1	16.0	12.4	13.3	10.8	11.8
O-P-Q-R-S-T	CEE11	25.4	25.2	24.1	24.9	20.6	22.1	21.9	22.9	19.1	20.6
	EU14	33.4	33.2	30.4	31.1	32.6	33.2	30.3	31.3	31.6	32.1

Notes: CAP: capitals; URB: predominantly urban regions; INT-M: intermediate-metropolitan regions; INT-N: intermediate-nonmetropolitan regions; RUR: predominantly rural regions. See Table 2 for more details about the analysed sectors.

Source: Authors' own calculation based on Eurostat.

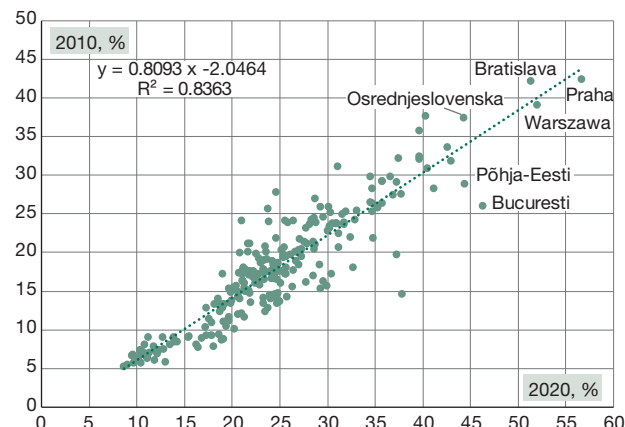
Both key indicators of restructuring – hours worked and productivity – show positive changes in the CEE11 from 2000, with employment increasing in higher-productivity sectors. However, the catching-up process slowed after 2008, only resuming in 2016. Business services and household service sectors saw rapid productivity growth after 2017, reaching 37%-43% of the EU14 average. In contrast, productivity in the manufacturing sector has remained stagnant, fluctuating between 26% and 28% of the EU14 since 2009, indicating a lack of catching-up in this sector.

The changes in the sectoral structure of urban-rural regions

We identified five regional types based on employment and productivity changes. Over a decade, employment grew at a similar rate across all regional types in both groups, with slightly higher growth in capitals. However, by 2020, employment distribution differed significantly: in the EU14, 38% were employed in urban regions and 15.3% in rural, while in the CEE11, 10.4% were employed in urban regions and 30.4% in rural.

Both country groups show changes in the economic structure by region type, with distinct features based on the share of employed persons (Table 4). The shift in labour specialisation within the EU is evident in manufacturing and business services.

Figure 2
Gross value added per employee in the CEE11 compared to the EU14



Source: Authors' own calculation based on Eurostat.

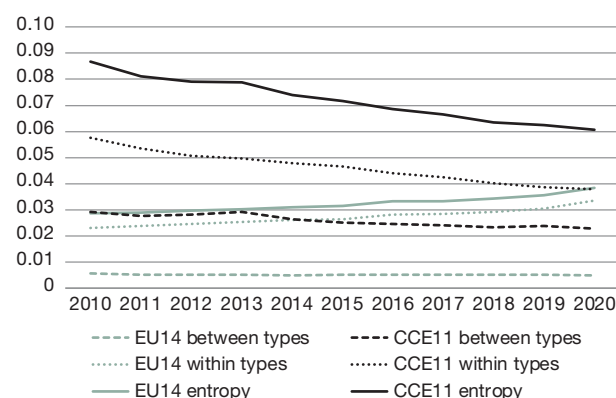
Manufacturing has been playing a prominent role in the CEE11, with a decline mainly in capital regions due to deindustrialisation. For urban regions in the CEE11, minimal change indicates stagnation but the employment share remains 1.5 times higher than the EU14 in 2020. In other CEE11 region types, manufacturing employment is about 1.5 times the EU14 average, showing international specialisation within the EU. Meanwhile, the EU14 saw a decline in manufacturing employment across all regions, with rural areas stabilising.

In business services (K-L-M-N), the share of employed persons increased across all regions in both groups. Capitals have significantly higher shares, while urban regions in both groups are similar. However, other CEE11 regions have much lower shares than their EU14 counterparts. In rural CEE11 regions, agriculture still has a high share, though it is steadily declining due to sectoral transformation.

As noted in the theoretical overview, successful structural transformation is marked by rising productivity. In nearly all 239 CEE11 regions, productivity increased from 2010 to 2020, with a strong correlation ($R^2=0.8363$; Figure 2). Capital regions saw dynamic productivity growth, though they still reached only 55%-70% of the EU14 average in 2020, with the highest ratios in Czechia, Poland, Slovakia, Romania, Slovenia and Estonia.

The generalised Theil index reveals different patterns of inequality between regions as well as among and within region types based on the GVA per employed person. Regarding disparities among regions, there were different patterns for the two country groups. In the EU14 (entropy), inequality starts low and gradually increases, while in the

Figure 3
Inequalities of gross value added per employee based on the generalised Theil index



Source: Authors' own calculation based on Eurostat.

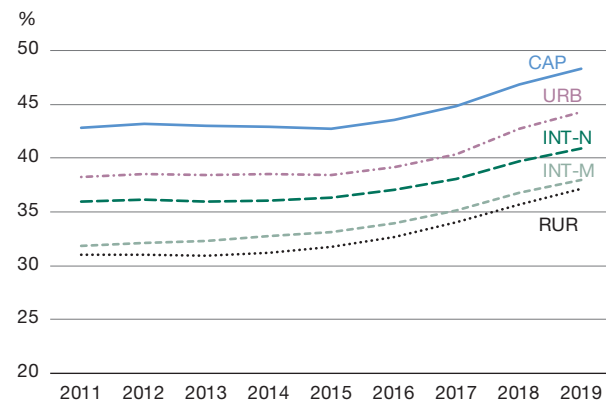
CEE11 (entropy), it begins higher and decreases, remaining about 1.5 times higher in 2020 (Figure 3). Inequalities among region types remain stable but are nearly five times higher in the CEE11 than in the EU14. Inequalities within region types in the CEE11 start high and decrease, while in the EU14, they begin lower and increase, reaching similar levels by 2020, indicating comparable dispersion within types for both groups.

Inequalities among region types remain essentially unchanged for both country groups, but in the EU14, they are almost negligible, whereas, in the CEE11, they are nearly five times higher. Inequalities within types of regions in the CEE11 start from a high value and gradually decrease, while in the EU14, inequalities within types of regions start from a much lower value and gradually increase, becoming nearly equal in 2020. Inequalities within types are similar for both country groups, indicating a comparable level of dispersion within types.

Examining the productivity trends of CEE11 regions, it can be observed that the capitals and urban regions surpass the other three region types and gradually approach 45%-50% of the values of EU14 region types from 2016 onwards (Figure 4). The catching-up process of the two intermediate and the rural regions is also noticeable, but they lag behind the urban regions.

The data raises important questions related to our research, such as how regions with improving productivity and employment are distributed across different region types in the EU14 and CEE11. It also prompts an analysis of whether traditional centre-periphery relationships persist and how labour division is evolving between the two groups. A closer look at the spatial concentration of

Figure 4
Productivity gross value added per employee relative to EU14, euro



Notes: CAP: capitals; URB: predominantly urban regions; INT-M: intermediate-metropolitan regions; INT-N: intermediate-nonmetropolitan regions; RUR: predominantly rural regions.

Source: Authors' own calculation based on Eurostat.

manufacturing and business services will provide deeper insights into these dynamics.

Spatial concentration of manufacturing and business services

Recent literature highlights the growing importance of agglomeration advantages linked to the spatial concentration of strategic tradeable industries. The spatial concentration of employment and GVA reveals similar trends, with differences tied to productivity levels. From 2010 to 2020, we examine the spatial concentration of manufacturing and business services (Table 5). Significant differences in employment distribution are evident: in the CEE11, manufacturing is concentrated in intermediate and rural regions, while in the EU14, it is focused in urban and both intermediate regions. Business services are concentrated in capital cities in the CEE11 and urban regions in the EU14, with regional population and employment distribution playing a key role in these patterns.

In the CEE11, business services are highly concentrated based on the number of employed persons, while manufacturing is more dispersed. In contrast, the EU14 shows a moderate concentration in manufacturing and a more dispersed distribution of business services (Figure 5). Thus, while the CEE11 sees strong concentration in business services, the EU14 experiences less concentration in manufacturing.

When measured by GVA, the spatial concentration of sectors differs from that based on employment (Fig-

Table 5
Distribution of the employed workers in manufacturing and business services

	Manufacturing				Business services			
	CEE11		EU14		CEE11		EU14	
	2010	2020	2010	2020	2010	2020	2010	2020
CAP	8.8	8.1	4.9	4.4	36.3	38.9	16.3	17.1
URB	9.9	9.8	35.3	34.8	13.5	13.8	43.2	43.3
INT-M	22.2	22.7	19.6	20.1	17.9	17.5	16.5	16.4
INT-N	26.3	26.2	22.0	21.8	15.0	13.7	13.4	12.9
RUR	32.9	33.3	18.2	18.8	17.3	16.1	10.6	10.4
Total	100	100	100	100	100	100	100	100

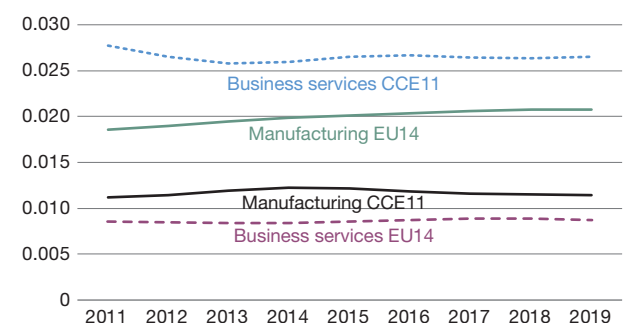
Notes: CAP: capitals; URB: predominantly urban regions; INT-M: intermediate-metropolitan regions; INT-N: intermediate-nonmetropolitan regions; RUR: predominantly rural regions. See Table 2 for more details about the analysed sectors. Business services consist of financial and insurance activities; real estate activities; professional, scientific and technical activities; administrative and support service activities.

Source: Authors' own calculation based on Eurostat.

ure 6). Manufacturing is highly concentrated in both country groups, especially in the EU14, while business services are more dispersed. This pattern mirrors the employment-based distribution, with manufacturing concentrated and business services dispersed in the EU14.

During the analysed period, diverse regional development paths emerge, reflecting regional characteristics. In the capital regions of CEE11, higher-productivity activities are concentrated, with urbanisation agglomeration advantages likely emerging. Like urban areas in the EU14, deindus-

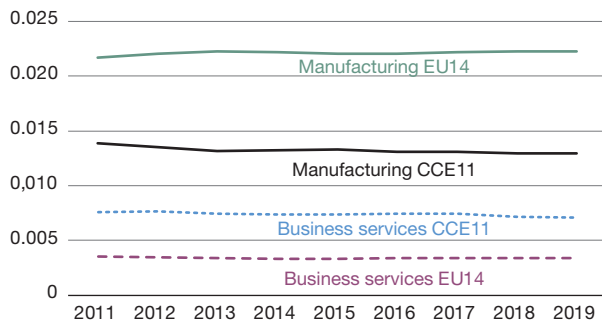
Figure 5
Spatial concentration of key sectors based on the number of employed workers calculated by the Theil index



Notes: A three-year moving average is used. Business services consist of financial and insurance activities; real estate activities; professional, scientific and technical activities; administrative and support service activities.

Source: Authors' own calculation based on Eurostat.

Figure 6
Spatial concentration of key sectors based on gross value added calculated by the Theil index



Notes: A three-year moving average was used. Business services consist of financial and insurance activities; real estate activities; professional, scientific and technical activities; administrative and support service activities.

Source: Authors' own calculation based on Eurostat.

trialisation is occurring, with manufacturing declining and business services strengthening. Outside the capitals in the CEE11, however, manufacturing is growing, indicating reindustrialisation, while similar regions in the EU14 continue deindustrialising. These trends are important for developing regional strategies and understanding regional inequalities and economic dynamics.

Conclusion

The analysis of regional economic processes and inequalities in the CEE11 has long been a key topic in both regional policy and scientific discourse. The current economic and environmental crises further highlight the importance of understanding the development paths of less developed regions. This study explores how the CEE11 countries' catching-up process with the EU14 unfolded, focusing on economic restructuring by sector.

The empirical analysis shows that while economic transformation and modernisation are evident across all CEE11 regions, the pace of change varies. Diverse regional development paths emerged, and the economic structures of CEE11 regions differ from those of the EU14.

The capital and urban regions in both country groups show deindustrialisation, but in CEE11, manufacturing remains slightly higher, and business services are lower than in the EU14. The intermediate metropolitan type of regions in CEE11 have a higher share of manufacturing and a lower share of services compared to the EU14. Intermediate-non-metropolitan regions in CEE11 have a high share of agriculture and manufacturing, while services lag behind the EU14. Rural CEE11 regions are dominated by agriculture and manufacturing, with minimal services.

In the CEE11, reindustrialisation is mainly seen outside the capital regions, unlike in the EU14, where services dominate not only in capitals but also in non-capital areas. A centre-periphery pattern emerges within the CEE11, contrary to the EU14, where high-value services support manufacturing in urban areas, while in the CEE11, low-value industrial activities shift to intermediate and rural regions. Similarly, within the CEE11, higher-productivity services concentrate in capitals, limiting the growth of business services elsewhere, where only low-productivity manufacturing or agriculture, along with local services, remain.

In CEE11 capital regions, higher productivity activities are emerging due to globalisation and urban agglomeration. Outside the capitals, manufacturing is increasing, signalling reindustrialisation, while EU14 regions are experiencing deindustrialisation. However, manufacturing productivity in CEE11 regions remains low at 26%–28% of the EU14 average. Services in these regions are limited, and the role of agriculture is declining, though the sector still employs a third of the workforce. Notably, no link was found between the share of agriculture in employment and the productivity of lagging areas, indicating that improving productivity in agriculture and manufacturing will be crucial for rural regions' future development.

In summary, the differences in sectoral concentration can be attributed to two key factors.

Urban network. In CEE11 countries, the urban network is generally more monocentric than in western Europe, with few urban regions outside the capitals, only 16 in the 11 countries. The first-tier cities, especially the capitals, have an increasingly concentrated population, providing business services for the entire country. Furthermore, governments support capital regions disproportionately more than their size would justify, which has been creating bias between places and people (Parkinson et al.; 2015, Cardoso & Meijers, 2016). Due to this dominance and bias towards capital cities, second-tier cities are comparatively marginalised, and their economies develop relatively slower. Hence, there is a lack of second-tier urban regions that have taken on the “engine” role, as observed in the EU14 (Camagni et al., 2015).

Reindustrialisation effect. Economic policies in CEE11 countries focus predominantly on manufacturing and financing reindustrialisation programmes, partly out of necessity. However, data indicates that the productivity of the manufacturing sector in CEE11 is low: it has been stagnating for years and is not approaching the EU14 countries' average. Many processing industries in non-metropolitan, rural regions operate with low productivity

with standardised activities. This situation will likely result in a “development trap” for most of these regions (Diemer et al., 2022), and the enduring centre-(semi)periphery division between older and newer EU member states and between CEE capitals and rural regions.

Our analysis highlights key processes for regional economic development policies. Over the past decade, the CEE11 region benefited from manufacturing growth driven by low wages. However, increasing sectoral value added is crucial to addressing the challenges of the digital and green transition. Without place-sensitive policies (Laursen & Lange, 2024), inequalities are likely to widen, especially as urban areas gain more advantages in the service sector. Moreover, the twin transition is likely to amplify the spatial inequalities and worrisome future tendency of economic divergence (Maucorps et al., 2023). The EU and member states must implement policies beyond current cohesion mechanisms to counter these trends.

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