



EVALUATION OF THE TRANSPORT SECTOR IN EUROPEAN UNION MEMBER STATES

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Abstract: *The aim of the article is an attempt to assess the condition of the transport sector in EU countries. The analysis focused on the assessment of the importance of this sector in the national economy, also in the context of job creation. The differentiation of selected parameters describing the productivity of the transport sector at the level of the economies of the EU Member States was assessed. The specificity of this process was assessed in the context of differences between the countries of the "old" and "new" Union. The convergence processes taking place in this area within a group of EU countries were analyzed.*

Key words: *transport sector, employment, productivity, EU countries*

Introduction

Currently, transport is one of the key sectors of the modern economy. It covers a complex network of private and public enterprises. Effective transport services and efficient infrastructure determine the possibility of using the economic potential of a given area. Transport services are also important from the point of view of commercial competitiveness, as the availability of both finished products and raw materials has a significant impact on production processes and the selection of commercial partners. Transport has a big impact on growth and employment. The transport industry directly employs around 10 million people and produces around 5% of gross domestic product (GDP). Efficient transport systems are also fundamental to the ability of European companies to compete in the global economy, as logistics such as transport and warehousing are estimated to account for 10-15% of total production costs [3]. However, the efficiency of this sector varies greatly between EU countries, which results in significant differences in the value of the product produced in this sector. EU Member States also differ in the level of involvement of the transport sector in job creation.

The aim of the analysis is an attempt to assess the macroeconomic efficiency of the transport sector in the EU. The analysis focused on the assessment of the sector's performance, measured by gross value added, as well as the possible job creation. Selected parameters describing the productivity of the transport sector were examined at the level of national economies of the European Union. The specificity of this process has been assessed in the context of the differences between the countries of the „old“ and „new“ Union. This allowed for the assessment of the convergence process taking place in this area in the group of EU countries.

The problem of measuring the efficiency of the transport sector

At the macroeconomic level, the importance of transport and related mobility is related to the level of production, employment and income in the national economy. As research in this field shows, in many developed economies, transport accounts for 6% to 12% of GDP, and logistics costs can range from 6% to 25% of GDP. The value of all transport assets, including infrastructure and vehicles, can therefore account for half of the GDP of a developed economy [8]. At the microeconomic level, transport is related to producer, consumer and distribution costs [6]. Research conducted in this area indicates a large differentiation of the transport price in individual EU countries [7].

The analysis of the efficiency of the transport sector on the macroeconomic level is significantly complicated by the fact that the sector consists of many sub-sectors and has a complex internal structure. This complex structure often makes it difficult to obtain information on the operational performance of the sector [10]. Consequently, in studies of transport systems, the assessment of efficiency is often based on the results of the entire transport sector [5][9].

Freight transportation is an essential part of any modern economy. However, it causes a heavy burden on the environment through harmful emissions. In many studies, the problem of economic efficiency of the transport sector is closely related to the assessment of the environmental impact of transport. The issues of energy efficiency and CO₂ emissions are indicated there. These two issues fundamentally determine the assessment of universally understood transport efficiency. [1][2].

Materials and Methodology

Eurostat data was used to carry out the assumed assessment of the performance of the transport sector in the Member States of the European Union. [3]. The analysis covers the indicators determining the level of gross value added per employee in sector H (NACE_R2 - transportation and storage) and the share of the transport sector in the total employment level in the national economy (NACE_R2 - in total business economy). The scale of dispersion of the analyzed parameters at the level of EU Member States was determined with the use of statistical measures.

For the purposes of examining the level of inequality in the context of the „old“ and „new“ EU, two groups of countries were distinguished: (1) EU-15 - countries representing highly developed economies with market traditions, admitted to the EU until 2004 (excluding Malta) and (2) EU- CEE – the countries of Central and Eastern Europe joined the EU structures after 2004 with experiences of systemic transformation. The planned measurement of convergence taking place in the group of EU countries in transport sector efficiency was based on the analysis of the convergence process in the group of EU countries (β and σ) observed in 2009-2018. The expected effect of the convergence process in this case was an increase in the level of labour productivity measured by gross value added per employee, with a simultaneous reduction in the degree of dispersion of this indicator. The analysis used the concept of conditional beta convergence considering different initial conditions of the system and predicting faster outliers catching up with the target and the concept of sigma convergence defined as a reduction in the scatter of the obtained results. The analysis assumes that there is beta convergence in the study area if countries with an initially worse value of a given variable (the lowest level of the indicator) catch up with the gap, showing a faster pace of transition to the expected state. The occurrence of the sigma convergence means the achievement of the expected reduction in



the dispersion level of the examined feature in time. The convergence analysis also assesses the involvement of the transport sector in job creation.

Results

The analysis of Eurostat data on the level of efficiency of the transport sector shows a significant differentiation in the level of gross value added per employee depending on the member state. The value of the share of the transport sector in the total employment level is characterized by a lower differentiation (tab. 1).

Table 1. Gross value added per employee and employees by sector as % of employees by total business economy, in sector H (transportation and storage), the EU Member States, in 2018 and change in the period 2009-2018)

EU Member States	Groups of EU	Gross value added per employee - in thousand euro. in sector H				Employees by sector H as % of employees by total business economy			
		2018	Change 2009-2018	Rankings		2018	Change 2009-2018	Rankings	
				2018	2009			2018	2009
Luxembourg	EU-15	94.9	34.9	1	6	8,0%	2,4%	17	4
Denmark	EU-15	90.5	26.6	2	4	8.4%	0.5%	13	12
Belgium	EU-15	85.4	14.6	3	2	8.5%	0.5%	12	11
Ireland	EU-15	84.9	-3.6	4	1	6.0%	0.7%	25	25
Netherlands	EU-15	81.9	18.7	5	5	7.5%	3.5%	21	3
Austria	EU-15	76.1	12.1	6	3	7.6%	1.2%	20	15
Sweden	EU-15	66.6	17.6	7	13	8.3%	1.0%	15	9
Spain	EU-15	65.3	10.9	8	8	7.2%	0.1%	22	22
Finland	EU-15	65.0	11.5	9	9	9.2%	1.0%	7	5
France	EU-15	64.4	8.3	10	7	9.0%	0.6%	9	8
Italy	EU-15	61.5	10.4	11	11	9.2%	-0.2%	8	13
Germany	EU-15	50.0	0.7	12	12	8.0%	-0.1%	18	21
Slovenia	EU-CEE	47.6	18.5	13	16	8.4%	-0.1%	14	19
Portugal	EU-15	45.8	3.2	14	15	5.9%	-0.3%	26	26
Cyprus	EU-15	44.8	-1.5	15	14	7.1%	1.3%	23	18
Greece	EU-15	40.5	-10.7	16	10	6.8%	0.3%	24	24
Estonia	EU-CEE	33.0	9.8	17	19	9.8%	0.1%	3	6
Czechia	EU-CEE	31.4	7.9	18	18	8.5%	0.4%	11	14
Slovakia	EU-CEE	29.7	14.9	19	23	8.1%	1.3%	16	10
Croatia	EU-CEE	29.3	5.4	20	17	7.9%	-0.8%	19	23
Poland	EU-CEE	25.3	7.7	21	21	9.3%	-0.8%	6	17
Lithuania	EU-CEE	25.1	12.4	22	24	14.9%	-3.1%	1	2
Latvia	EU-CEE	23.9	5.5	23	20	13.0%	-0.2%	2	1
Hungary	EU-CEE	23.5	7.0	24	22	9.6%	0.0%	5	7
Bulgaria	EU-CEE	16.1	7.0	25	26	8.9%	-0.8%	10	20
Romania	EU-CEE	15.1	4.9	26	25	9.7%	-1.2%	4	16

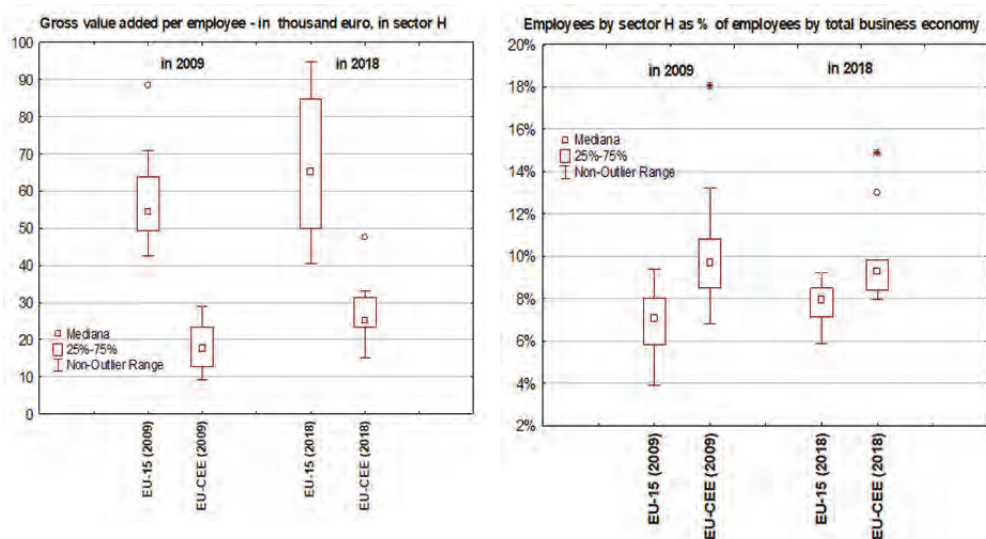
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Selected statistics							
Average	EU	50.7	9.8		8.6%	0.3%	
Interval		79.8			9.0%		
Average	EU-15	67.8	10.2		7.8%	0.8%	
Interval		54.4			3.3%		
Average	EU-CEE	27.3	9.2		9.8%	-0.5%	
Interval		32.5			7.0%		

Source: own study based on [Eurostat data, 2021]

The analysis of the distribution of the gross value added index per employee shows a particularly low efficiency in the group of EU countries in Central and Eastern Europe - in this group of countries the level of this index is significantly lower than in other EU countries. In 2018, in the EU-CEE group (CEE countries joining the EU after 2004), the average level of value added per employee was approximately 60% lower than in the EU-15 group. At the same time, the share of the transport sector in the employment level did not show such large differentiation between the studied groups and was 25% higher in the EU-CEE group compared to the EU-15. The level of dispersion of the analyzed parameters in the groups of the EU-15 and EU-CEE countries is presented in Fig. 1.

Figure 1. Dispersion of the parameters: a) gross value added per employee and b) employees by sector H (transportation and storage) as % of employees by total business economy, in sector H for two groups of EU states: EU-15 and EU-CEE (in 2009 and 2018)

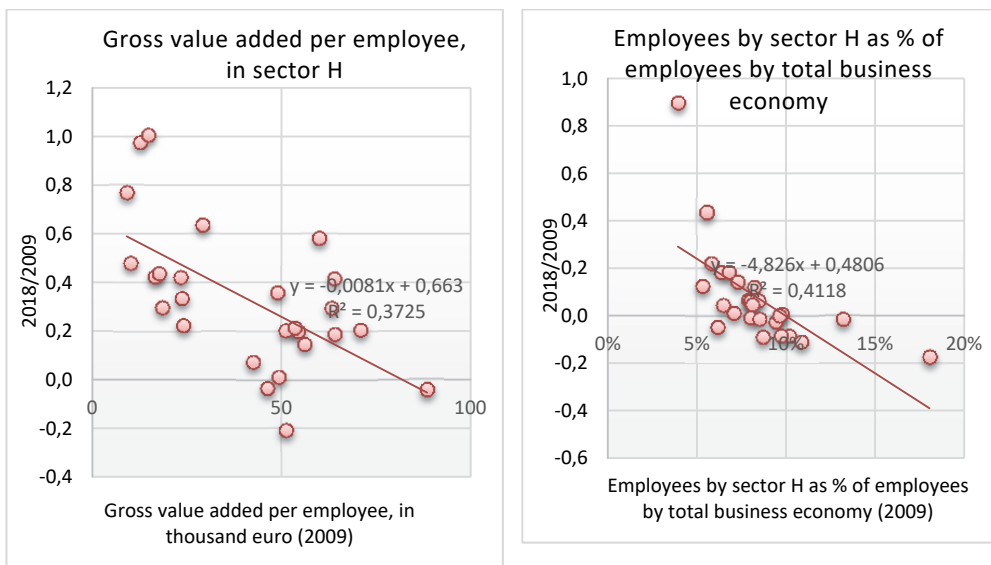


Source: own study.

The assumed assessment of the convergence process taking place in the group of EU countries in the field of macroeconomic efficiency of the transport sector in individual Member States was based on the assessment of changes over time in the level of the analyzed indicators. Assuming different initial conditions for individual EU countries

determined by the level of the studied variables in 2009, the rate of change of the analyzed parameters in individual countries over the years 2009-2018 was determined (2018/2009 report). It was assumed that in the case of member states with difficult initial conditions (low gross value added per employee), this relation should be as high as possible, indicating a fast growth rate of the examined parameter, resulting in catching up with the group (beta convergence). The obtained results are shown in Fig. 2.

Figure 2. The effect of group catch-up in the EU-27 group, in 2017 and change in the period 1997-2017 (beta convergence)

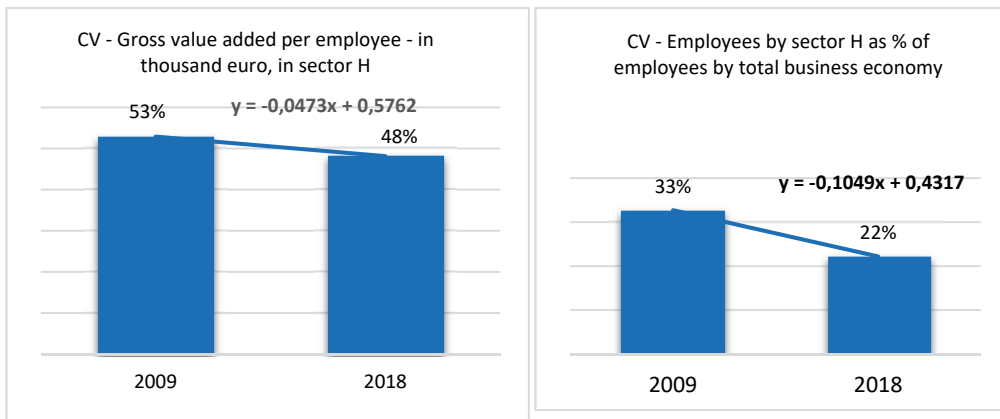


Source: own study.

The obtained results of beta convergence indicate that in the case of both parameters there is a noticeable livid downward trend suggesting the expected over time equalization of the distance by the outliers. An additional analysis of changes in the dispersion level of the examined indicators in the period 2009-2018 carried out with the use of the variability index (sigma convergence) confirmed, however, the high level of differentiation of the examined parameters in relation to the level of gross value added per employee. On the other hand, over the analyzed 10 years, the level of dispersion of the ratio of the share of jobs offered by the transport sector in the total economy decreased significantly (Fig. 3).

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Figure 3. The coefficient of variation CV in the EU-27 group, in the period 1997-2017 (sigma convergence)



Source: own study.

Conclusions

The analysis of changes in the efficiency of the transport sector from the perspective of the economies of the EU countries and the convergence processes taking place in this area shows that in the case of both analyzed parameters, it can be concluded that individual national economies achieve the average with a simultaneous decrease in the dispersion of these parameters in the studied group.

The obtained results showed that in transport the level of gross value added per employee is a parameter that strongly differentiates the level of productivity achieved in individual EU countries. These disproportions are visible especially at the level of the so-called „Old“ and „new“ Union. Despite the 10-year increase in the analyzed indicator in both groups (on average by EUR 10.2 thousand per person in the EU-15 and 9,2 thousand per person in the EU-CEE group), the disproportions in this respect are still huge. The conducted analysis of convergence indicates positive processes in this area. CEE increased the level of gross value added per employee by over 50%, while in the EU-15 group it was only approx. 18%. The existing huge initial differences in the value of this indicator mean that at present, however, the disproportions are still huge. The countries with the lowest level of the analyzed indicator are currently Bulgaria and Romania, which in 2018 achieved gross value added per person employed in transport at a level below 20% of the value in the most efficient countries (Luxembourg, Denmark).

The conducted analysis shows that while in relation to the group of European Union economies we can talk about a relatively stable share of jobs in the transport sector in relation to the total economy, different trends are visible in the perspective of the surveyed groups - while in the EU-CEE countries the share of jobs offered by the transport sector in the analyzed period decreased from 10.3 to 9.8%, while in relation to the EU-15 countries, an increase in this indicator is noticeable (from 6.9 to 7.8%). Also in this case, we can say about visible convergence processes by approaching the average values in the group, but in this case, it concerns clearly different structural changes in the economies of the EU countries.



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