REMUNERATION OF DRIVERS IN ROAD FREIGHT TRANSPORT IN THE EU

MILOŠ POLIAK[1], KRISTIÁN ČULÍK[2], LUCIA ŠVÁBOVÁ[3], ELVIRA NICA[4]

Abstract

Remuneration of road transport drivers has been a hot topic since the EU's enlargement in 2004 when the new Member States strongly influenced the international road freight transport in Western Europe. The market opening to carriers from the new Member States has raised concerns that national carriers will lose their position in the original markets. Truck drivers from Central Europe have proven to be much less expensive in terms of wages and social protection. Therefore, Western European countries have started to make efforts to protect their carriers by restricting cabotage transport. Moreover, since 2015, Germany, France and other countries have begun to apply national law to drivers of international road transport. In Germany and France, some laws determine the minimum hourly gross wage. This paper focuses on analysing hourly wages in road freight transport in Western Europe (Austria, Germany, Belgium, France) and Central Europe (Slovakia, Czech Republic, Poland, Hungary). The analysis is carried out based on real data on 126,600 transport companies from 2014 to 2018. The analysis focuses on the period before 2019, because the international road freight transport has been significantly affected by the COVID–19 pandemic. In the study, numerical characteristics of the average wage development time series are used, such as the chronological average and the average growth rate. The method of analysis of variance is applied to compare the countries. The study results show that there have been such significant differences in road transport in recent years that Eastern carriers cannot meet Western countries' set conditions. In addition, the wage growth over time is approximately the same, suggesting that Western member countries cannot correspond to the average wages of Eastern countries neither now nor in the near

1   Department of Road and Urban Transport, Faculty of Operation and Economics of Transport and Communications, University of Žilina, Slovak Republic, e-mail: milos.poliak@uniza.sk, ORCID: 0000-0002-9149-2439

2   Department of Road and Urban Transport, Faculty of Operation and Economics of Transport and Communications, University of Žilina, Slovak Republic, e-mail: kristian.culik@uniza.sk, ORCID: 0000-0001-7574-3384

3   Department of Economy, Faculty of Operation and Economics of Transport and Communications, University of Žilina, Slovak Republic, e-mail: lucia.svabova@uniza.sk, ORCID: 0000-0002-4722-4103

4   The Faculty of Administration and Public Management, Bucharest University of Economic Studies, Romania, e-mail: elvira.nica@ase.ro, ORCID: 0000-0002-7383-2161

future. The research results are useful in creating fair conditions for the EU single market in road freight transport.

Keywords: road transport; economy; drivers; remuneration; wage

1. Introduction

The international road freight transport market in Western Europe was significantly affected by new member states of the European Union (EU). In May 2004, Poland, Czech Republic, Slovakia, Hungary, and six other Central and Eastern European countries had become member states of the EU and had joined a broad common transport market that should offer similar opportunities for all carriers. But in fact, many social, tax, price, and legislative conditions were still not the same for all companies. Therefore, the EU has an effort to unify these different conditions, for example, in the field of social legislation [1, 2]. Furthermore, since April 2007, truck drivers' working hours in the European Union are controlled by regulation (EC) No. 561/2006 [3]. According to the new regulation, road transport companies must organize drivers' work to comply with the rules and be made liable for committed infringements [4]. Thus, we can say that these regulations have an impact also on road safety. This is mainly because fatigue is related to non-compliance with the work mode of drivers. The fact is that fatigue is a more frequent cause of accidents than driving under the influence of alcohol [5]. Digital tachographs are used to ensure control of the work mode [6] usually with specific software [7, 8].

The accession of new Eastern European countries to the EU has dramatically affected the international road freight transport market. The expansion of this market has caused national carriers, especially in Western Europe, to start worrying about their position in this market. Namely, the drivers of carriers from Central Europe have proved to be much less expensive in terms of wages and social protection than those from Western Europe. The European labour market allows for the border-free mobility of workers across 31 countries [9]. Therefore, the countries of Western Europe have started to make efforts to protect their carriers by limiting the so-called cabotage transport. Cabotage is a type of transportation within a state where the vehicle is not registered [10, 11]. Therefore, after 2004, cabotage transport was prohibited in the form of transitional restrictions on access treaties to protect national carriers. After a transitional period, Regulations (EC) No 1071/2009 and No 1072/2009 of the European Parliament and the Council laid down restrictive conditions. Under them, carriers were able to carry out cabotage transports [12]. Some EU Member States were dissatisfied with this adjustment and pointed out that transport companies from the eastern part of the EU had lower driver remuneration costs [13]. Since 2015, Germany, France and other countries have started to apply national law to international road transport drivers, claiming that the wage costs of drivers in Western European countries are comparable to those in Central Europe [14, 15]. They point out that the

requirement to demonstrate wages at the national level is a requirement that protects national carriers. However, this paper aims to show that there are such differences in drivers' hourly wages in selected EU countries that wage costs cannot be considered comparable. Therefore, the requirement to apply national law is discriminatory for the Central European road freight transport companies. In addition, the article deals with the research question of whether, assuming that the wage costs of carriers are significantly different in the countries, it can be said that this difference between them decreases over time. The analysis focuses on four Western European countries: Austria, Germany, Belgium, France and four Central European countries: Slovakia, Czech Republic, Poland, Hungary. These countries were chosen because the average wages in these two groups of countries are comparable. The first four countries represent the original EU member states, and the second four are the new member states that joined the EU after 2004. Germany and France were selected for the analysis because of their specific policy on drivers' remuneration.

The main strength of the article is the use of an extensive database of real data on 126,600 companies in the field of road freight transport during the period 2014 to 2018. This may appear to be outdated data. The fact is that international road freight and passenger transport has been significantly affected by the COVID-19 pandemic [16, 17]. Therefore, the analysis focuses on the period before 2019.

The main aim of the article is its possible direct use in practice to create fair conditions in the EU's single market in road freight transport and provide evidence that requiring a national minimum wage tends to distort the common market. According to our knowledge, other authors have not dealt with such an analysis in their studies so far; therefore, we want to fill this gap with this article and consider it innovative in this respect. Moreover, the contribution of the paper is also an assessment of the impact of legislation on driver remuneration in the EU. From a statistical point of view, this study proves the existence of significant differences among the average wages in transport companies in selected eight EU countries.

The rest of the article is organized as follows. The Literature review highlights the current state of the art in the studies of other authors. As the topic of differentiation of driver remuneration in road freight transport in different countries is, according to our knowledge, not analysed in more detail in the literature, this literature review focuses on the ways of remuneration of drivers in the road transport sector. The third part, Methodology and data, presents the dataset used for this analysis and the statistical methods used in this study. The fourth part describes the main results of the analysis and their interpretation and consequences for the practice. In the Discussion, the impact of the legislation on driver remuneration in the EU is discussed. The last section summarizes the main results and concludes.

2. Literature Review

Regulation of the market of road freight transport by the EU affects, among other things, improving road safety, as the number of working hours of the drivers is regulated and limited. Road safety is a significant issue, but on the other hand, the sustainability of the road freight transport market is also connected with its economy. Economists generally agree that the deregulation of a market leads to increased efficiency [18] and lower prices for consumers [19, 20]. But on the other hand, as the authors state in their studies, it has a negative impact on social sustainability [21, 22] and the environment [23, 24]. Many current studies, for example [25, 26], identify the significance of wage inequality in the EU [27, 28]. Some studies also aim at wages in passenger transport [29]. Problems with wage inequality of truck drivers exist not only in the EU but also in other countries of the world. For example, the study [30] deals with US truck drivers' unbalanced salaries compared to other professions. In the study [31], the author state that after the enlargement of the EU by new member states, the truck drivers have become interchangeable on the EU market. They can be replaced by drivers from Eastern Europe who are much less costly in terms of wages and social protection. Therefore, Western European countries have felt the need to protect their carriers. This brought a reduction of cabotage transports [32] and compulsory minimal wages on their territories. Cabotage is defined according to Sternberg et al. [33], as the transport of goods or passengers between two places in the same country by a transport operator from another country. In 2009 and 2012, respectively, 12 new member states of the EU (which joined the EU in 2004 or later) were allowed for the first time to conduct cabotage transports in the EU. In [34], the authors state that it has a crucial effect on the transport market. Carries from various countries offer the same services ensured by drivers with very different wages. And here, a problem arose with the different minimum wages of drivers in EU countries. Therefore, from 2015, Germany, France and other countries started to apply restricting method for foreign road carriers [35] by exercising the national law to the salaries of international road transport drivers to protect their national carriers. They defend this step by claiming that the wage costs of drivers in Western European countries are comparable to those in Central Europe. In Germany, the Minimum Wage Act (Mindestlohngesetz, "MiLoG") entered into force in 2014 [36]. According to [37], MiLog imitates the participation of Central and Eastern European carriers in the European international road haulage market in a way that is contrary to the principles of fair competition. A similar situation is also in France. There is the Labor Code "Loi Macron" in force. It states the minimum hourly gross wage to EUR 10.39 for drivers sent by foreign carriers to France since 29th February 2020 [38, 39]. This regulation does not apply to transits [40]. However, the truth is that, as stated in the study of National Labour Inspectorate [41], there are different average and minimum wages in individual member states in the EU. The studies of Raczkowski et al. [42] and authors in [43] also show that the statutory minimum wages in the EU member states are very different. According to Schulten et al. [44], there are the following levels of the statutory minimum wage in euros per hour in the countries selected for this study: 10.15 in France, 9.66 in Belgium, 9.35 in Germany, 3.50 in Poland, 3.40 in Czech Republic, 3.33 in Slovakia, and 2.85 in Hungary. In Austria, there is no

statutory minimum wage. Instead, there is a collectively agreed minimum wage norm for the lowest pay grade in collective agreements. From these data, it is obvious that the minimum wages across the countries are very different. But this also implies that the implementation of a European minimum wage policy in all the member states would be difficult or impossible [43, 45].

In addition to the problems mentioned above with the minimum wage and the EU's efforts, but especially of individual countries to unify the wages of freight transport drivers, since 2009, a so-called "three-in-seven" rule is in force. It means that the carrier can conduct a maximum of three transports seven days after the unloading [46]. In some countries, there are also national more strict rules for cabotage.

All the facts mentioned above suggest an effort to prevent the availability of transport for carriers from Central Europe in individual EU countries in Western Europe. Arguments about the comparability of the minimum wage fail on the facts we are trying to prove in this study.

3. Materials and Methods

This study aims to prove, using statistical methods, the existence of significant differences among the average wages in transport companies in selected eight EU countries. For the analysis, we used a database of 126,600 transport companies from the following countries: Slovakia, the Czech Republic, Hungary, Poland, Austria, Germany, Belgium, and France. The first four are the countries of the Visegrad Group. Therefore, a comparison of these econom- ically and culturally similar countries is appropriate. The research required the same number of more developed Western European countries. Austria, Germany, Belgium, and France are the source or destination of many V4 carriers. In addition, many Slovak transport companies have confirmed in previous surveys that they have problems complying with minimum wages and related legislation in Germany and France. These companies operate in the economic activity category NACE 494, which includes the following subcategories: NACE 4940 – Freight transport by road, removals (used mainly in Germany), NACE 4941 – Freight transport by road and NACE 4942 – Removal services. Table 1 shows the numbers and relative frequencies of enterprises included in the analysis by NACE category and by country. The left part of the table shows the numbers of enterprises in absolute numbers. The right part of the table shows the percentages calculated as the share of enterprises in each NACE category in the given country. In addition, the left part of the table presents the total percentage of compa- nies from a given country (column Total share).

Tab. 1. Frequencies of companies in the database

Country ISO code	NACE code absolute frequency			Total	Total share
	4940	4941	4942		
AT	1	135	0	136	0.5
BE	0	3129	156	3285	13.2
CZ	8	3135	17	3160	12.7
DE	80	295	4	379	1.5
FR	0	6429	378	6807	27.4
HU	0	5144	32	5176	20.9
PL	0	2423	4	2427	9.8
SK	0	3402	33	3435	13.8
Total	89	24092	624	24805	100

The data on the transport companies comes from the Amadeus database – A database of comparable financial information for public and private companies across Europe. We have the following variables: the country where the company operates, the NACE category of economic activity, and the average annual wage costs per employee from 2014 to 2018. To compare the development of annual wages in individual countries, we used the averages. At the same time, we aggregate the values for the given period using the chronological average because of the character of instantaneous time series of chronologically ordered data. The chronological average is calculated by (1):

$$\bar{y}_{CH} = \frac{1}{4}\left[\frac{y_{2014}}{2} + y_{2015} + y_{2016} + y_{2017} + \frac{y_{2018}}{2}\right] \tag{1}$$

$y_{2014}, \dots, y_{2018}$ – mean annual wages in the companies in the years 2014 – 2018.

In addition, we examine the development of the average annual wage in each country using the growth rates and aggregate these into the average growth rate by the geometric mean (2):

$$\bar{k}_t = \sqrt[3]{k_{2015} \cdot k_{2016} \cdot k_{2017} \cdot k_{2018}} \tag{2}$$

$k_t = \frac{y_t}{y_{t-1}}$ – growth rate comparing the value y_t to the previous period y_{t-1} for t = 2015,…,2018 (denoted by the years of measurement).

The increase rate quantifies absolute differences in average annual wages, and for each country, we calculate the average increase of the wage growth, given by (3):

$$\bar{d}_t = \frac{\sum_{t=2015}^{2018} d_t}{3} \tag{3}$$

$d_t = y_t - y_{t-1}$ – absolute differences in annual wages, t = 2015,…,2018.

After characterizing and analysing the development of the average wage in transport companies in a given country, we focused on analysing differences among the wages in the countries. We used the Analysis of Variance (ANOVA) model to compare average wages, but, as the number of companies in individual countries is significantly unbalanced, we rather use a general linear model that serves the same purpose. The factor variable Country verified the differences among the average wages in the linear model. Using the test of the significance of the regression coefficient of this factor in a linear model, we verify the influence of the carrier's country on the mean wage. If significant differences in the mean wages were found using the ANOVA model, the subsequent post–hoc multiple comparisons were performed using the Games – Howell post–hoc test. This test finds those countries in which the mean wages differ significantly and subsequently create homogeneous subsets of countries in which the average annual wages can be considered the same. The Games – Howell method was chosen as suitable because of the heteroscedasticity of the subgroups [47]. Regarding the verification of the assumptions of the ANOVA, it yielded the following results. The normal distribution in the individual subgroups formed by the country factor was not confirmed by the Kolmogorov – Smirnov test and the graphical analysis. However, given the number of transport companies in the individual countries in the database, we consider this method robust enough to invalidate the normality assumption because of the central limit theorem [48, 49]. Homoscedasticity was verified using Levene's test, which rejected the null hypothesis about homoscedasticity. For this reason, we applied a robust Welch test instead of the ANOVA model. Using the Welch test, we obtained the same result as in the ANOVA model. In any case, if we used the Kruskal – Wallis test instead of the parametric ANOVA model, we would get the same results as from the parametric model.

All tests are performed at a significance level of 0.05. We use IBM SPSS Statistics software for the analysis, i.e. we present the results in the form of outputs from procedures from this software.
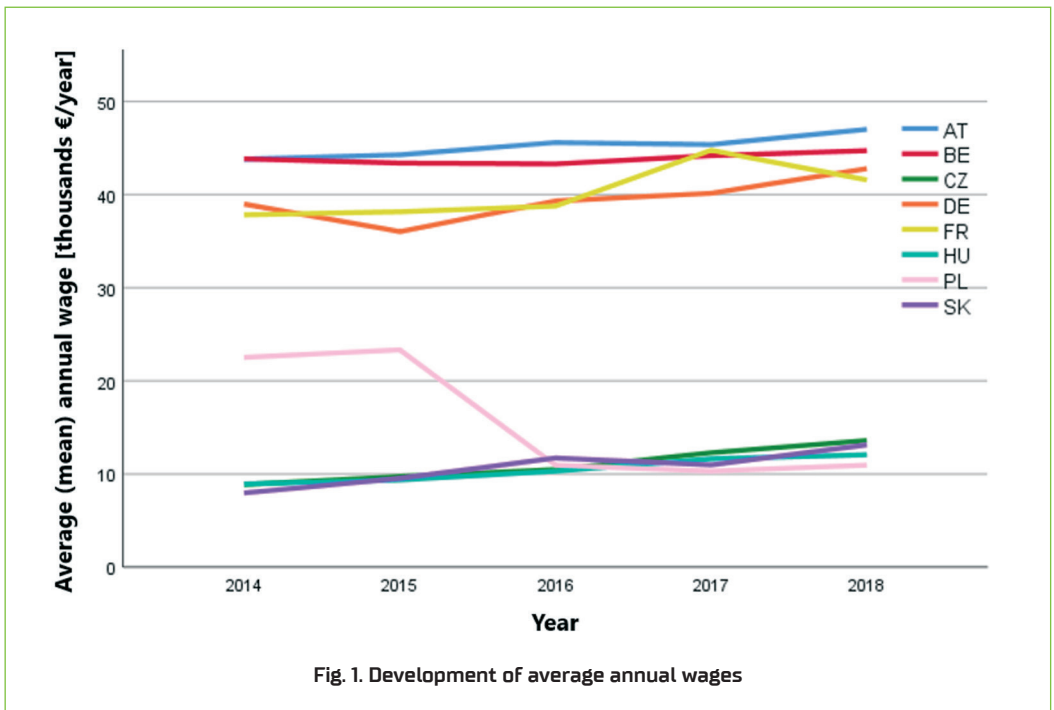
4. Results

The first step is to analyse the development of average annual wages in the transport companies in individual countries, Table 2 shows the average annual wages during the analysed period. The last column of the table shows the chronological mean of annual wages in each country.

Tab. 2. Development of the average annual wages

Country ISO code	Average annual wage [thousand €/employee]					Chronological mean
	2018	2017	2016	2015	2014	
SK	11.40	9.98	10.56	8.69	7.38	9.65
HU	11.17	10.90	9.68	8.78	8.41	9.79
CZ	13.11	11.33	9.72	8.98	8.24	10.18
PL	9.17	9.35	10.31	20.93	20.64	13.87
DE	44.91	40.76	47.02	36.73	42.63	42.07
FR	43.90	47.42	40.66	40.58	41.86	42.89
BE	46.41	45.90	44.86	44.94	45.35	45.40
AT	49.80	49.13	47.02	45.38	45.59	47.31

For better illustration, we also present the development of average annual wages in individual countries in Figure 1 in thousands of euros.


Fig. 1. Development of average annual wages

Table 2 and Figure 1 clearly show the difference among the wages in individual countries during the analysed period and average. Countries form two groups in which the average wages are similar. We verified and supported this assumption, i.e., the finding of inequality of average annual wages, using the linear model (ANOVA). At the same time, we created subsets of countries where the wages are similar within the subgroup, but the subsets were hetero-

geneous to each other. Finally, we focused on 2018 as the year with the latest data that we had available. Figure 2 shows the average annual wages (in thousands of euros) in transport companies in the analysed countries in 2018.

Fig. 2. Average annual wages in 2018
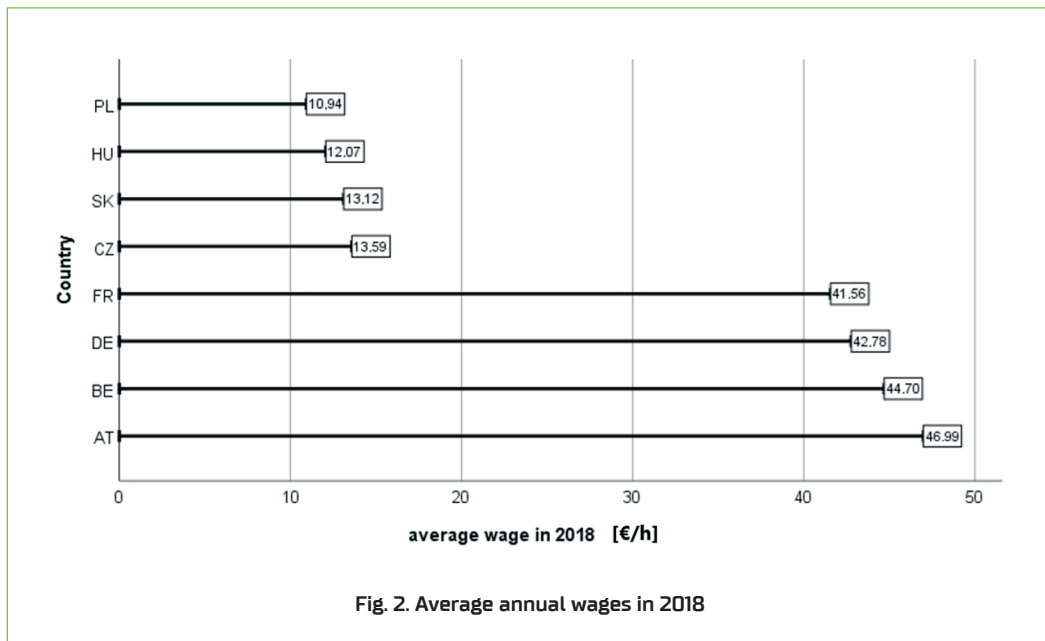
All previous results indicate the existence of a significant difference between the average annual wages in individual countries. Therefore, we assume that countries can be classified into two homogeneous groups based on the level of wages in transport companies. This assumption is also confirmed by the test of the influence of the country factor on the average annual wage, the result of which is shown in Table 3.

Tab. 3. Linear model of the average annual wages with the country factor

Tests of Between-Subjects Effects. Dependent Variable: average 2018					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3,439,252.746[1]	7	491,321.821	772.241	<0.05
Intercept	2,886,797.881	1	2,886,797.881	4 537.358	<0.05
country	3,439,252.746	7	491,321.821	772.241	<0.05
Error	10,003,424.569	15,723	636.229		
Total	21,811,115.223	15,731			
Corrected Total	13,442,677.314	15,730			

[1] R Squared = .256 (Adjusted R Squared = .256)

This model shows that the country is a factor that significantly affects the mean annual wage in the transport sector (p-value < 0.05). The average annual wages are, therefore, signif-icantly different in these eight countries. This result confirms our assumption. Moreover, we can say that country of the transport company explains 25.6% of the variability in the average annual wages.

Subsequently, Appendix A lists the multiple comparison results by the Games – Howell test. The results show that the countries can be disjointly divided into two homogeneous subsets, where the annual wages are significantly different from each other between the subsets and can be considered not different within the subgroup. Table 4 lists these two subsets. The values in the columns are the average annual wages in a given country in 2018. The last row of the table is the p-value of the test of differences in means within the subset. According to these values, it is also intuitively clear that the average wages between the two subsets are significantly different. However, within the subgroup, average annual wages are similar.

Tab. 4. Homogenous subsets of the countries

Average 2018			
Country ISO code	Number of companies	Subset 1	Subset 2
PL	1,668.00	10.94	
HU	4,528.00	12.07	
SK	2,953.00	13.12	
CZ	1,148.00	13.59	
FR	2,289.00		41.56
DE	195.00		42.78
BE	2,847.00		44.70
AT	103.00		46.99
Sig.		0.93	0.16

These two subsets correspond to the expected division of countries into the original EU member states from Western Europe and the newer member states from Central Europe.

We can also look at the development of wages in terms of time. The annual growth rate, i.e., the year-by-year increases (decreases) in the annual wages during the analysed period, together with the average growth rate for each country, are shown in Figure 3.

Fig. 3. Growth rates of the average annual wages

However, we can notice that the individual growth rates do not differ significantly among countries (p-value of the test = 0.642). Their average growth rates are (with a small deviation of Poland) similar. However, at growth rates, this statement may be skewed; the situation of the same percentage increase in the driver's salary from different bases is incomparable. However, the same result is confirmed if we look at the year-on-year absolute changes (increases or decreases) in the level of wages in individual countries (Figure 4). Their comparison among the countries confirms that wages in all countries increase by a similar amount (p-value of the test = 0.055) except Poland in 2016, caused probably by the new requirements in German (national MiLoG) law.
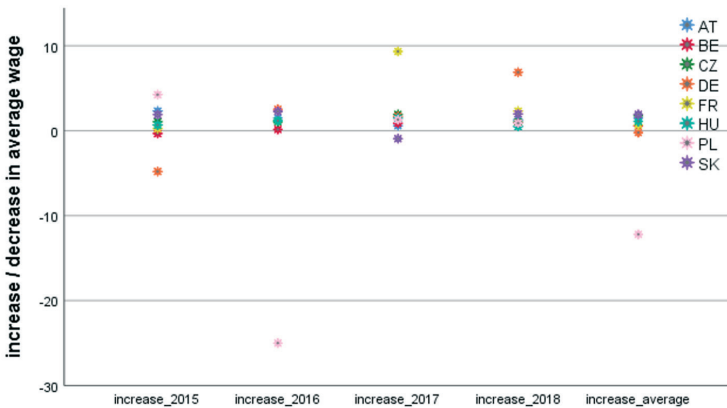

Fig. 4. Absolute differences in the average annual wages

However, these results can be interpreted as follows. First, the wages in the transport sector have been different in analysed countries in recent years. Moreover, the time developments suggest that the situation will be similar in the future, provided that there will be no sudden changes, such as national policy or other intervention. Growth rates, but even absolute increases, do not indicate that the countries of Central Europe could reach the level of wages of the countries of Western Europe over time.

5. Discussion

All the analysis results have shown that there are such significant differences in wages in the transport sector that it is unrealistic, if not impossible, to apply the requirements on national transport drivers' wages for the carriers from all countries. Germany's and France's arguments on comparable wage levels to support domestic carriers are therefore proven to be incorrect. Gis and Waśkiewicz [50] also pointed out that these decisions may turn out to be unfavourable for the current significant market position of Polish international road carriers. For transit and bilateral transport, it will not be possible to apply the national minimum wage. Transit is a type of transport in which the carrier does not load or unload the consignment in a specific state. That means that transit does not represent competition to national carriers in the national market of transport. Bilateral transports have a source or a destination in the country of the carrier's registration. From February 2022, if a carrier based in Slovakia carries out transport from Slovakia to France with transit through the Czech Republic and Germany, it will not have to prove the wage value to the inspection authorities of other states.

Similarly, if it carried out transport from France to Slovakia, it would be bilateral transport. Therefore, the carrier has not met the wage conditions of other states. But the issue of non-bilateral international transport operation remains. These transports have a place of loading and unloading in a country where the carrier is not registered. In this case, starting and destination countries can apply the requirement for minimum wages at the national level. It means that the carrier has to meet these conditions and prove it. It will distort the common market of the EU. According to Report of Transport Motor Institute [42] MiLoG (Germany) and Loi Macron (France) introduce incommensurable administrative burdens and interfere with economy under the pretext of the alleged fight against social dumping. Their wording seems to be directly in conflict with Article 56 and Article 58 of the Treaty on the Functioning of the European Union, violating the principle of freedom to provide services.

Based on the previous example of a carrier who accomplished a transport in France, we can assume that he needs to arrange return transport. If he cannot find a transport offer to Slovakia, the carrier will look for consignments to the Czech Republic. There are market distortions. The Slovak carrier will have to meet and prove French minimal wage. On the other hand, the same transport for the Czech carrier is bilateral. Therefore, he does not have to meet French wage conditions. Czech company will be able to provide transportation

at a lower price. It leads to a situation where Slovak carriers will return to Slovakia without cargo. This unfavourable situation indirectly and unnecessarily increases CO_2 emissions from road transport [51]. We can expect the same cases among several EU countries. The measure will increase unused rides, which will negatively affect the environment and energy consumption. If we want to ensure a single and efficient EU market, it is necessary not to restrict international road transport. The free movement of goods, services, and people is the greatest asset of the EU.

6. Conclusions

Based on the research, we can conclude that in France, Germany, Belgium, and Austria, the annual cost per driver is significantly higher (varying from 42.07 thousand to 47.31 thousand euros per year) compared the wages in Slovakia, the Czech Republic, Poland, and Hungary (from 9.65 thousand to 13.87 thousand euros per year). The differences among the countries are very significant. Moreover, the situation appears to be similar also in the future. Considering the time development of the average annual wages, where there is no evidence that the wages in the transport sector in Central European countries can be similar to the remuneration level in West Europe, the growth rates are similar in all compared countries. It means that east member states cannot "catch up" with average western wages. In Poland, a significant decrease in labour costs occurred between 2015 and 2016. At this time Germany came with new requirements. Carries from other countries had to comply with German national MiLoG law. In Poland, a significant proportion of drivers terminated their employment contracts this year. Subsequently, they made new contracts which means that carriers hired them as self-employed. Drivers became independent entrepreneurs with not own trucks. Western EU countries (Germany, for example) aimed to increase eastern carriers' costs. This change had the opposite impact, and the described transformation has reduced the labour costs in Poland. It was a non-systemic step. Self-employed drivers should also have social security benefits for employees. Our findings pointed to the significant differences in the level of remuneration in the transport sector. Therefore, we consider it right when individual states require a minimum wage level under the level given by the national law during cabotage transport. In practice, the problem is that western states require documents proving the minimum wage in national languages also for international transport. Drivers in the eastern states of the EU indeed have lower salaries and carriers lower wage costs. On the other hand, we do not consider translating documents into the languages of all countries of transport route the right solution.

The results of this research are directly applicable to setting fair conditions in the EU's single market for road freight transport. The study provides ample evidence to show that some EU Member States' minimum national wage requirements tend to distort the common market. The limitation of this study can be considered the fact that only some EU countries were selected for the analysis, for which we had available data. Nevertheless, we consider

the study results to be generalizable to other EU countries, where the same discrepancies in remuneration requirements in the transport sector occur. From February 2022, individual Member States will not be entitled to require compliance with the national minimum wage, which will change the conditions in the road freight transport market. The EU Member States will be still able to require compliance with the minimum wage in non–bilateral shipments. Therefore, the possible future research direction lies in the analysis of the changes in the drivers' remuneration after February 2022. The results of further research after 2022 will determine whether requiring a national minimum wage with a significant administrative burden produces the desired expected results, or it would be reasonable to refrain from declaring a minimum wage, also for non–bilateral shipments. The possible future direction of this study should also lie in the estimation of the impact of increased road freight transport on the environment. We will also focus on the influence of restrictions on international road freight transport.

7. Acknowledgement

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