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Road Traffic in Romania in European Context - an Economic and Social Approach. Part 1

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Abstract: This article is a further detail of the other one on the demographic crisis of Romania. (Pușcaci et al., 2016). The big gap with the EU average conceals a real crisis that affects the entire economic development and generates profound negative social effects. The lack of adequate road transport infrastructure deprives Romania of applying modern methods of just-in-time management and determines that comparative advantages - such as the relatively cheap and qualified labor force - are annihilated and ultimately derives a lack of attractiveness for external investors. But the most serious consequence is the large number of deaths, caused by road accidents, the direct consequence of the lack of a network of highways, and even of some traditional roads. For the positioning of Romania in a European context in terms of quantity, but also in terms of chronological evolution, we consider it is useful to analyze some indicators that commensurate the situation of Romania. We propose that these aspects be studied with the help of the statistical-mathematical instrumentation using the graphic method, for which we used the R Studio software.

Keywords: road infrastructure; highways; road accidents; fatality; corruption

JEL Code: O350; R1; R2; R3; R4; R5

1. Content

Although the importance of road infrastructure on society has become an axiom since the ancient period, see the roads or bridges built by the Romans, we will still look at some contemporary aspects related to the lack and benefits of an appropriate infrastructure in contemporary Romania.

We illustrate the importance of the transport infrastructure in terms of the largest producer and exporter of cars in Romania, that is Dacia-Renault respectively. The company's chief operating Renault conditioning operation uses firm capacity mentioned that: "Romanian state has to improve road infrastructure and sea". Failure of important transport infrastructure has led the company Renault not to develop the platform at Pitești, due to high transport costs to the borders of Romania, so that the French will not invest in Romania, and conclusively they will invest in the factory in Morocco. According to the same sources, the plant has an installed capacity of 350,000 cars annually and in 2013 produced a total of 342,620 units.

The Vice President of Dacia-Renault mentioned that: the lack of a freeway between Pitești and Sibiu generates additional costs of 166 euros for each car produced in Pitești compared with that produced in Morocco, which directly affects the competitiveness of the product. "While transporting a car from Pitești to Constanța costs 98 euros, and a similar car produced in Tangier-Morocco to a port over a distance of 29 kilometers costs 14 euros. By the highway construction to facilitate transport by car

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from Nădlac border, thus increasing the cost of a car only with 68 euros. Another problem encountered by the French management of the company is the average speed of the current transport on the roads which is 45 km per hour, and the highway will be increased to 80 km per hour. It is clearly a poor infrastructure that is affecting competitiveness, thus generating additional costs of 166 euros per piece.

Recently, the same manager - seeing that no concrete steps to achieve the highway are taken, he concludes: "It is a national basque. Its lack will have incalculable consequences". The lack of highway was perceived as an attack on the workplaces by the trade unionists of the plant, giving up their immediate claims, working conditions, better wages, etc. in favor of strikes and protest movements aimed at sensitizing the governors to the necessity to build a highway.

We have presented the direct and immediate effect of the lack of a highway, exactly by this example, and now, we will present the beneficial consequences for the development of an area in the country following the construction of a motorway. Thus, Ziarul Financiar estimates that: "The Gross Domestic Product of Constanta County has increased at a double speed, compared to that of the rest of the economy, since the opening of the Bucharest - Constanța highway in November 2012 and up to day, according to an analysis published by Ziarul Financiar. The nominal GDP of Constanța had an increase of 56% in the period 2012-2016, compared to a 29% nominal increase of Romania's GDP, an evolution that the publication puts also on the development of the infrastructure in the area".

For an assessment of road traffic density in Romania, in comparison with the other countries in the European Union, we present in Table no. 1 the data regarding the highways as well as the other roads. As it can be seen, although the data provided by Eurostat does not cover all 28 EU countries, they are still able to present large discrepancies/gaps in road density, arguing this with the very high values of coefficients of variation on the two categories of roads. At the same time, it can be noticed that the values recorded by Romania are close to the minimum values, which proves the precarious level of the road infrastructure in our country. But this data reflects only the quantitative side of the infrastructure as in Romania and the quality of roads is far inferior to that in other European countries.

Table 1. The Density of the roads in European Union in 2014

Statistics	Unit of measurement	N	Mean	St. Dev	Min	Max	Coefficient variation	Romania
motorway	motorway / 1.0000 km ²	23	21,1	20,900	0	79	99,11%	3
other type of road	meters per sq km	19	1178,6	774,684	122	3117	65,73%	357

Source of data: Eurostat

The density of roads in the EU countries for which we have data is also shown in Figure no. 1:

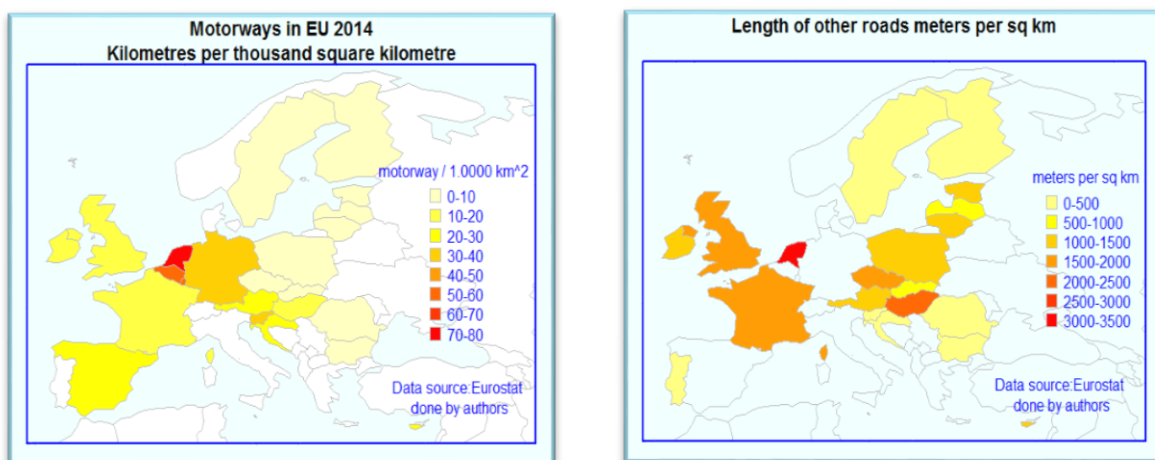


Figure 1. Density of roads in EU countries in 2014

This road situation -both in terms of quantity and quality - is unfortunately reflected directly on the number of road accidents. Thus, if at EU level, as a result of the preventive measures in the period 1991-2015, the average annual road traffic accident rate was -1,204%, in other words it was reduced by 1,204% each year, in Romania increased by 5,01%, registering the highest growth. We mention that at EU level - on average - has a reduction rate of -1.179%. The rates for changing road accident levels for EU countries between 1991 and 2015 are shown in Figure no. 2.

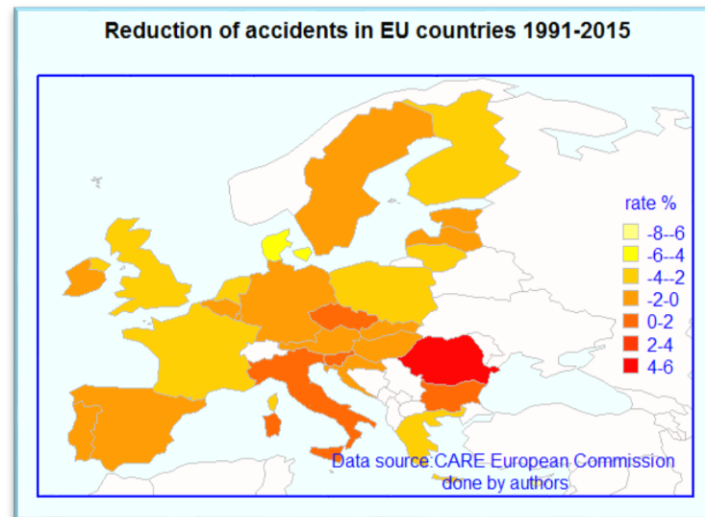


Figure 2. Reduction of accidents in EU countries between 1991-2015

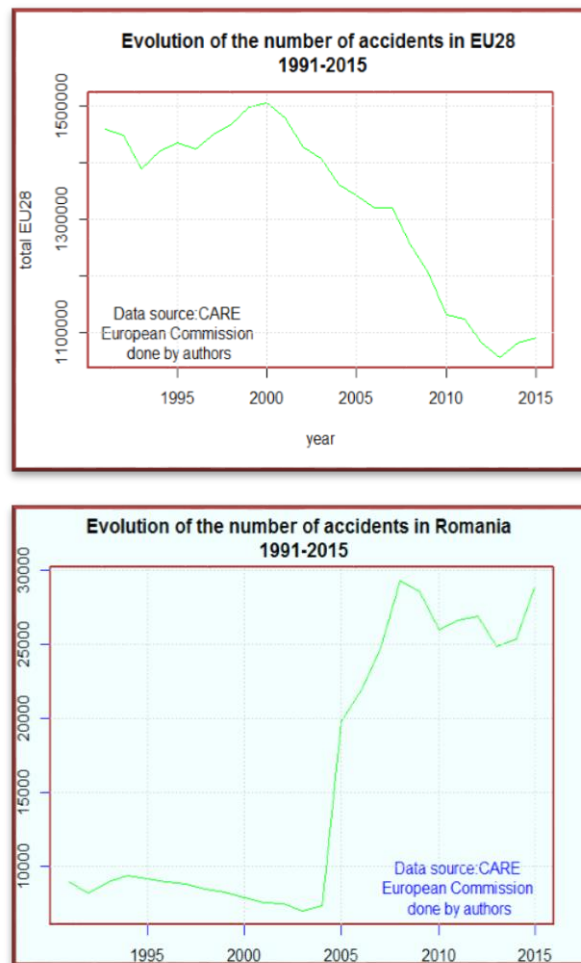


Figure 3. Evolution of the number of accidents in EU28 versus Romania

The contradictory evolution of the number of road accidents in Romania compared to those registered in total at EU level, as can be seen from the two areas of Figure no. 2, determines that the share of accidents in Romania compared to total EU28 will increase substantially. Thus, if in 1991 the number of accidents in Romania compared to the total EU accounted for 0.614%, in the year 2015 they reached 2,655%, in other words, an increase of more than four times.

The evolution of road traffic accidents in Romania vs total EU28 is presented in Figure no. 4, which shows a significant increase in the share of accidents in Romania compared to the total EU. If in 1991 Romania recorded about 0.5%, in 2015 it reached 2.5%.

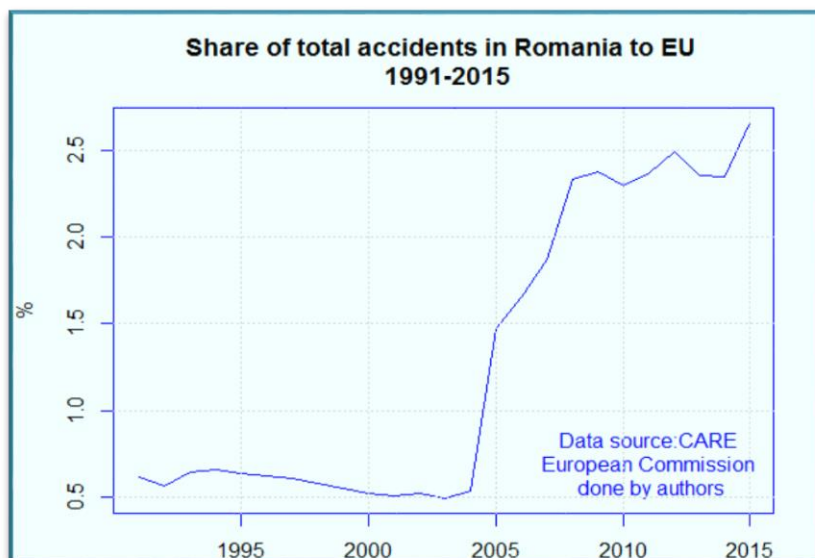


Figure 4. Share of total accidents in Romania to EU between 1991-2015

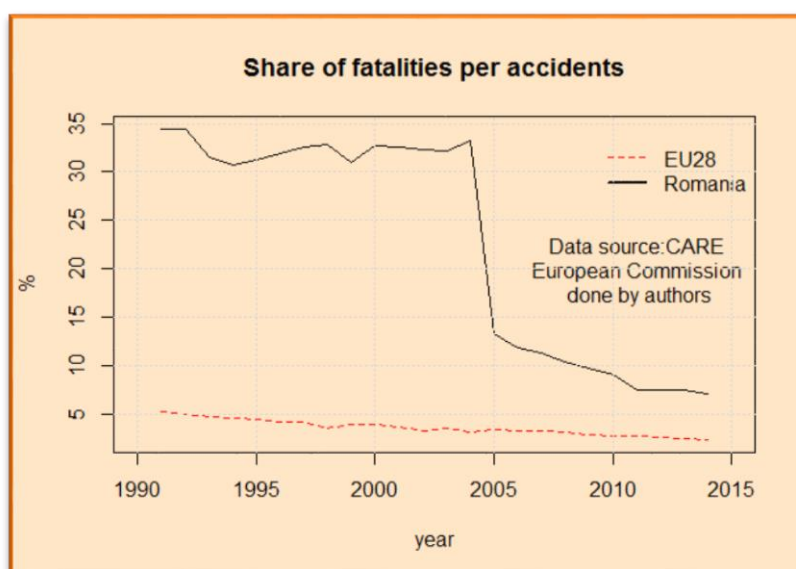


Figure 5. Share of fatalities per accidents in Romania versus EU between 1991-2015

A negative phenomenon is related to the fact that road accidents in Romania continue to record deaths, in other words, serious accidents. For the period 1991-2015, the average road fatalities in Romania were 22.8%, so from 100 traffic events 22.8 were fatalities. At the EU28 level, this indicator recorded only 3,623%. The evolution of fatalities related to road accidents is shown in Figure no 5. It can be said that the downward trend is both the road traffic prevention measures, but also the implementation of SMURD first aid service.

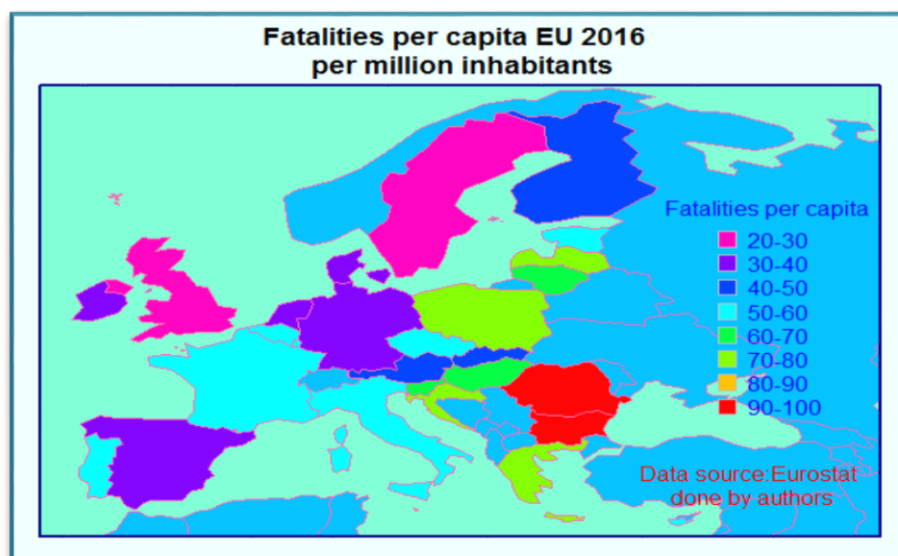


Figure 6. Fatalities per capita at million inhabitants in EU 2016

The gap between Romania and the EU countries and their average in terms of fatalities caused by road accidents can be highlighted by the fatalities related to the total population. Thus, Figure no. 6 depicts the large gaps in EU countries in 2016, from 20-30 to 90-100 deaths from road accidents per million inhabitants.

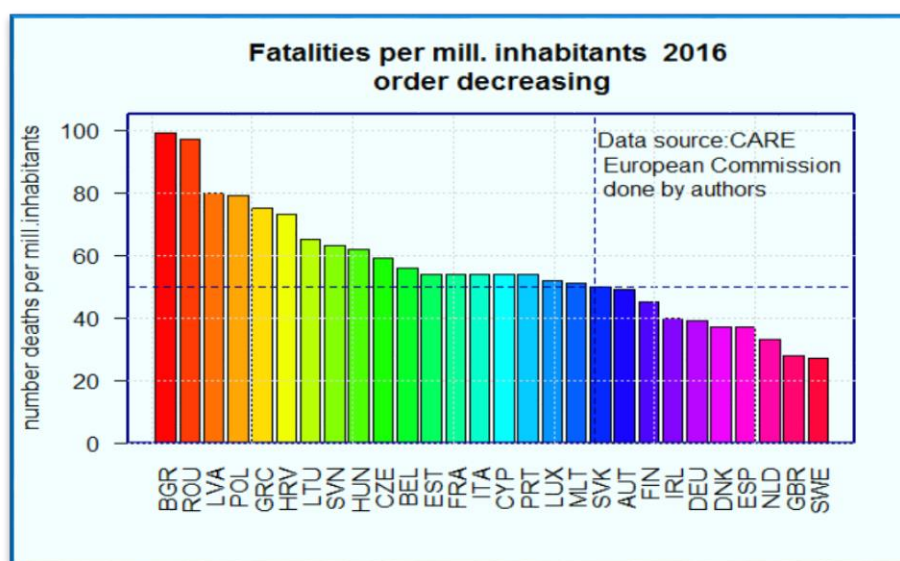


Figure 7. Fatalities per million inhabitants in 2016

The ranking of EU countries according to the number of deaths (fatalities) per million inhabitants is shown in Figure no. 7. As you can see, Romania records 97 deaths from road accidents to one million inhabitants and is situated alongside Bulgaria with 99 deaths per one million inhabitants, at the highest level of this indicator. It should be noted, as can be seen from Figure no. 7, that Romania is registering a level twice higher than the EU average, not to mention that some countries have this indicator three times smaller. The dotted lines in the figure indicate the average EU and country levels below and above this average.

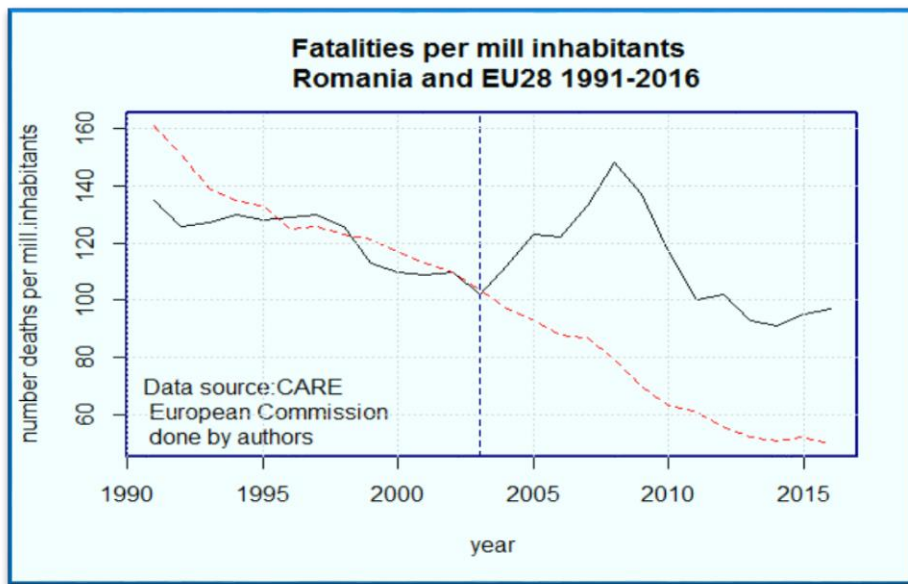


Figure 8. Fatalities per million inhabitants in Romania versus EU28 between 1991-2016

The evolution of the fatalities related to the number of the population at the level of Romania and the EU during the period 1991-2016, presented in Figure no. 8, reveals that until 2003 this indicator was higher in the EU, and after this year it became superior in Romania. This trend is due to the different, much higher, reduction rates in the EU compared to those registered by Romania. Also, the oscillating evolution on a downward trend registered by Romania, compared to a continuously descending trend of the EU, determines these contradictory developments of the number of fatalities reported to the population.

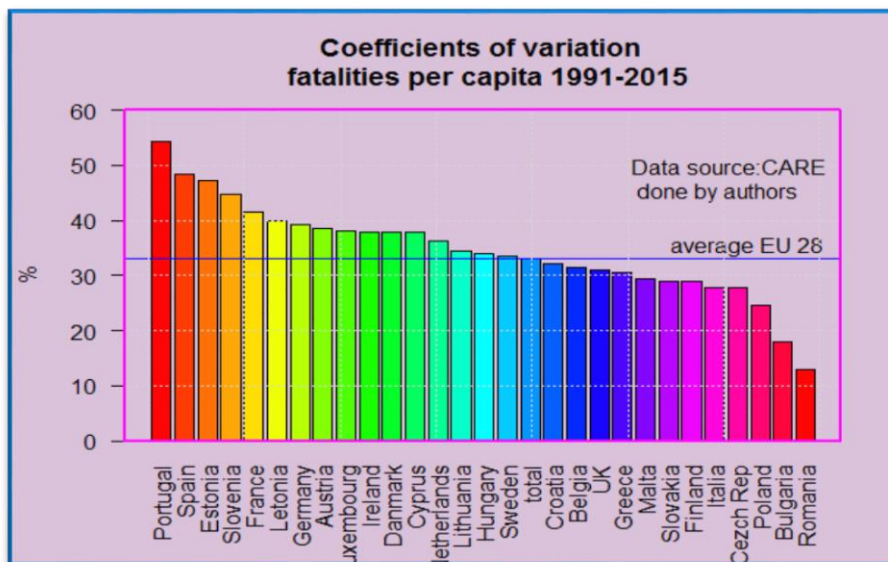


Figure 9. Coefficients of variation fatalities per capita between 1991-2015

The reductions in fatalities per inhabitant can also be assessed on the basis of the coefficients of variance calculated as the ratio between dispersion and average, which are shown in Figure no. 9. Romania is the last one on this indicator, whose coefficient of fatality variation per inhabitant was only 12.87%, while the European average of the period 1991-2015 was 33.17%. In other words, Romania records the lowest level of dispersion/variation in fatalities per capita between 1991 and 2015.

The evolution of fatalities per capita in the EU member states, as well as the EU as a whole, can be seen in Figure no. 10, which shows the downward trend of the indicator.

Different country variations as well as yearly variations are expressed in Figure no. 11, in which the changes to EU countries are shown on the left side and changes are made to the right. The continuous right represents the averages recorded either by countries or by years, and by the blue segments are the variation ranges of these mean sizes, with a probability of 95%.

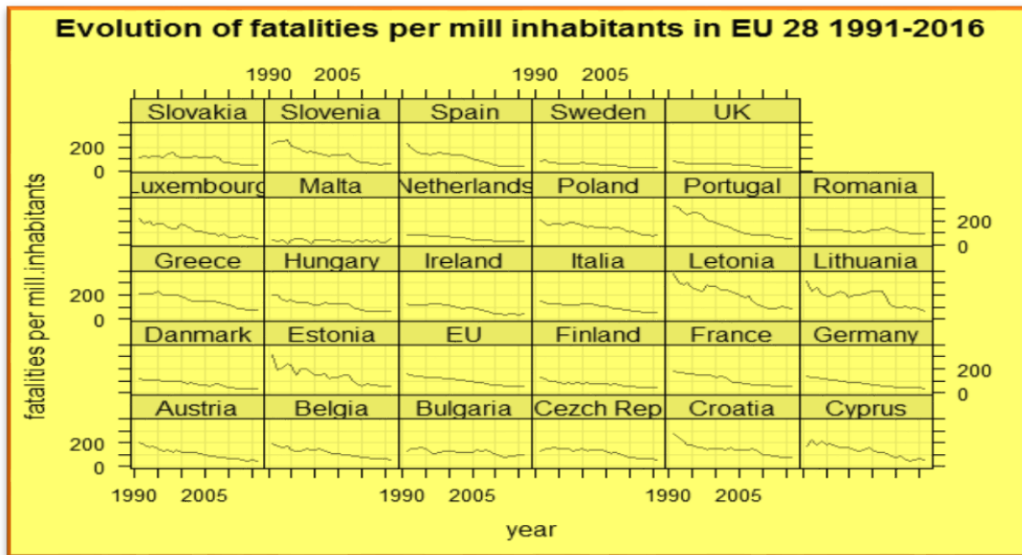


Figure 10. Evolution of fatalities per million inhabitants in EU28 between 1991-2016

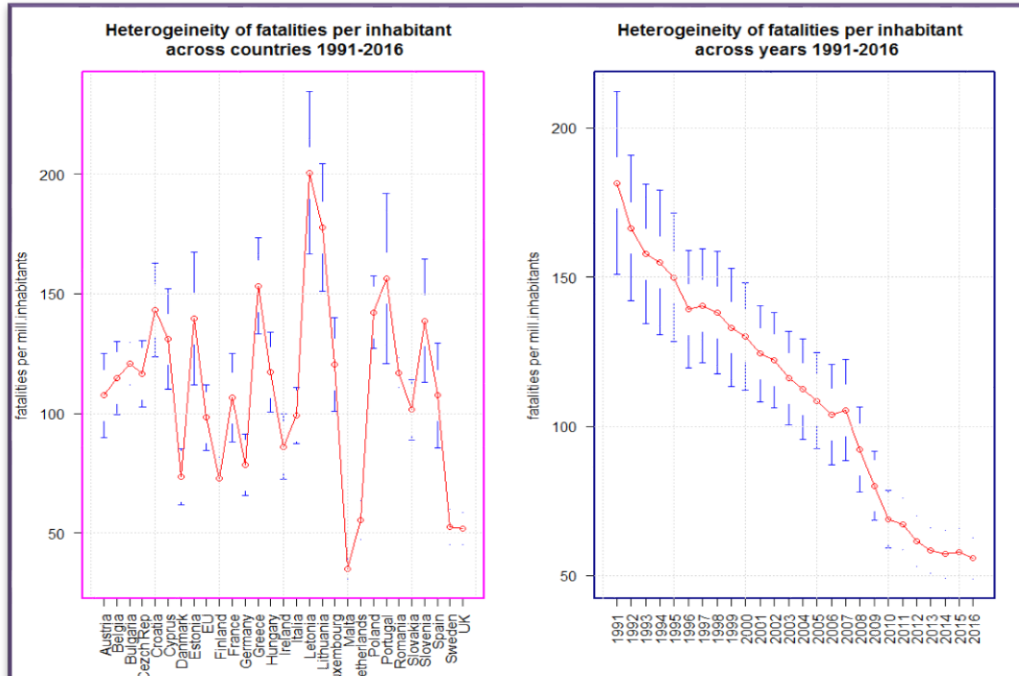


Figure 11. Heterogeneity of fatalities per inhabitants across countries and years between 1991-2016

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