THE 12TH EDITION OF THE INTERNATIONAL CONFERENCE
EUROPEAN INTEGRATION
REALITIES AND PERSPECTIVES

Road Traffic in Romania in European Context - an Economic and Social Approach. Part 2

Florin-Dan Pușcaciu[1], Rose-Marie Pușcaciu[2]

Abstract: This article is a further detail of the other one on the demographic crisis of Romania (Pușcaciu 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 Classification: O350; R1; R2; R3; R4; R5

Given these large discrepancies in the record of fatalities per capita, it is necessary to analyze some of the alleged causes that influence this indicator, such as: country level of development, level of corruption, and the degree of endowment with cars. It is a non exhaustive choice because besides the above-mentioned factors, we could also consider: the size of the roads and especially their quality, the size of the highways, the level of education and civilization of the inhabitants, the consumption of alcohol per capita, issues pertaining to obtaining a car license in each country, etc.

The dependence of fatalities per capita vs GDP per capita for the period 1995-2016 in EU countries is shown in Figure 12.

[1] Professor, PhD, Department of Economics, Danubius University of Galati, Romania, Address: 3 Galati Blvd., Galati 800654, Romania, Tel.: +40372361102, E-mail: fdpuscaciu@univ-danubius.ro.
[2], Senior Lecturer, PhD, Department of Economics, Danubius University of Galati, Romania, Address: 3 Galati Blvd., Galati 800654, Romania, Tel.: +40372361102, Corresponding author: rosemarie.puscaciu@univ-danubius.ro.

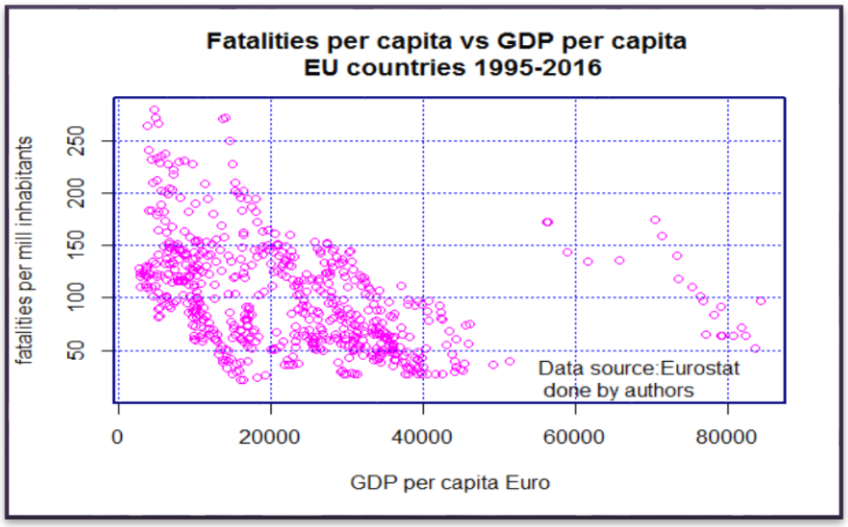

Figure 12. Fatalities per capita vs GDP per capita in EU countries between 1995-2016

The figure suggests an inverse dependence in the sense that the higher is GDP per capita, the fatalities per capita will be lower. From a statistical point of view, this addiction has been studied on the basis of panel-indexed data on countries and years. The data in Table no. 4 highlights that at EU level, in the period 1995-2016, the increase of GDP by 1.000 euros per inhabitant generated the reduction of the number of fatalities per inhabitant by 7.4 persons. Also, we can see the close correlation between the GDP per inhabitant, which expresses the level of development and the fatalities per inhabitant.

It can be concluded that the level of development of a country influences the fatalities, which is obvious from an intuitive point of view, as development involves better roads, more highways, better cars, and a higher level of education for drivers.

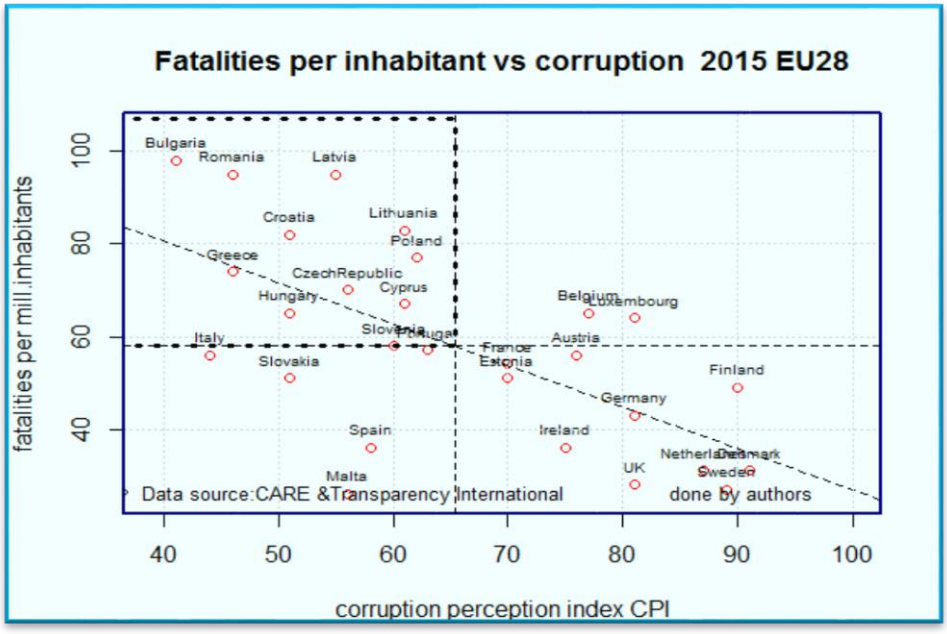

Figure 13. Fatalities per inhabitants vs corruption in EU28 in 2015

The dependence of fatalities on the level of corruption in the EU member states in 2015 is presented in Figure no. 13. The level of corruption is assessed through the Corruption Perception Index prepared by Transparency International. As it is built, a low level denotes high corruption, while a higher value index expresses less corruption. This index takes values between 0 and 100, in other words: 0 denotes the highest level of corruption, while 100 gives the lowest level of corruption. In 2015, at the level of the European Union, the average Corruption Perception Index was 65,357, while the average fatality rate per one million inhabitants was 58,036. These sizes are designated by the punctuated lines in Figure no. 13, thus obtaining four areas of the graph. Thus, the NW and SE, respectively upper and lower left, recording 23 of the 28 countries, confirm a dependence between the level of corruption and road fatalities. The NW region, which is populated by punctuated segments, is located at the extremity of Romania, grouping countries that record a high corruption index and fatalities over the EU average.

The number of cars per 100 inhabitants is shown in Figure no. 14, of which we note that despite the increase in the number of cars in circulation in Romania, our country is at the lowest endowment level, fact that justifies us not to say the number of cars themselves would be the cause of accidents, but the level and quality of the road infrastructure would contribute to these road events. We also take into account the size of roads, especially highways, and the lack of parking spaces in major cities, roads that pass through urban and rural areas. The high number of fatalities in terms of population, in terms of modest gear with cars reported to the population, causes Romania to record the highest level of fatalities in terms of number of cars, see Figure no. 15.

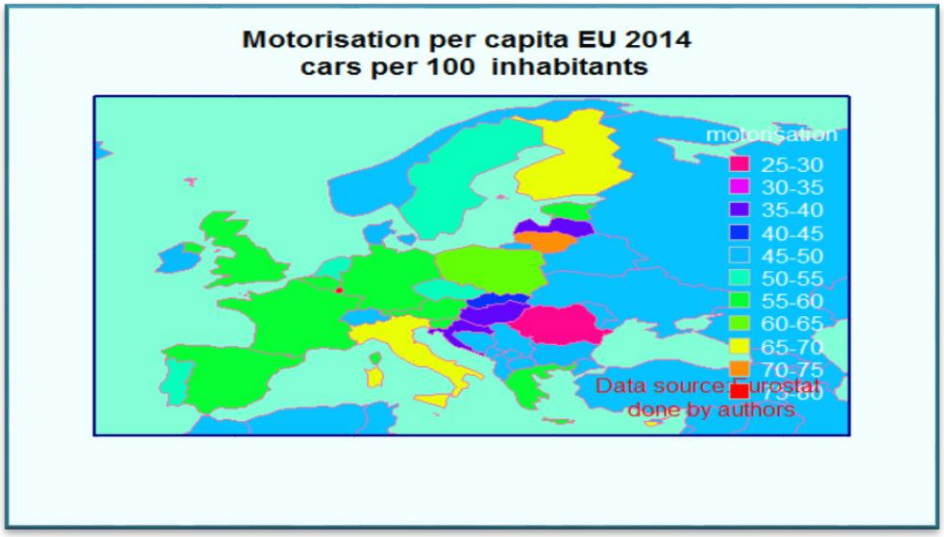

Figure 14. Motorisation cars per capita per 100 inhabitants in EU in 2014

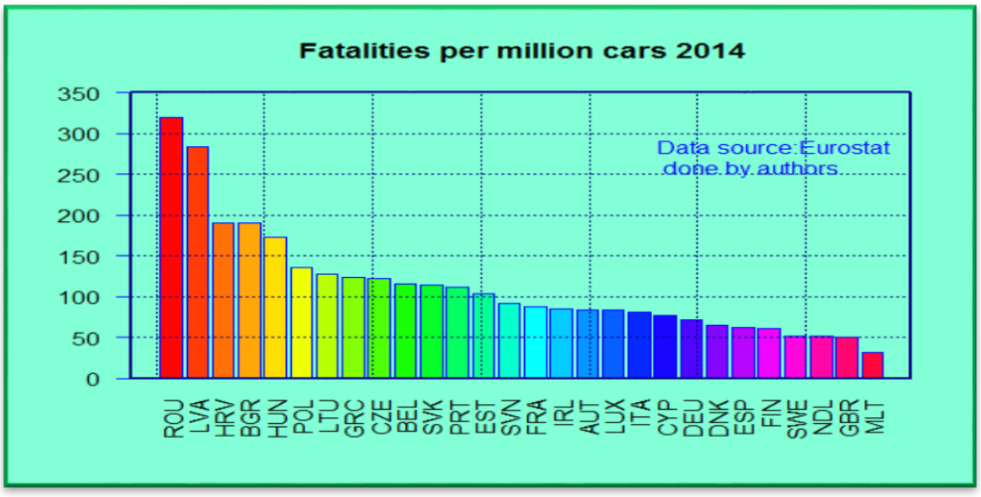

Figure 15. Fatalities per million cars in 2014

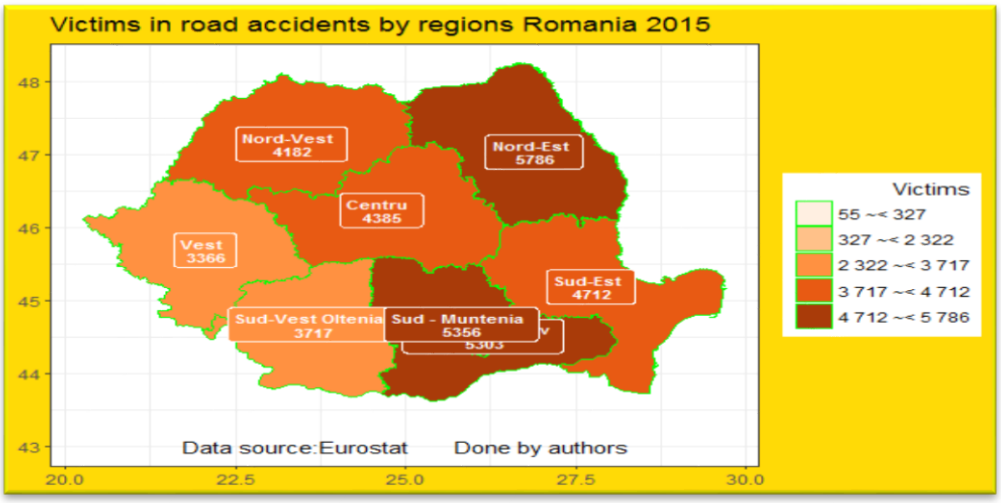

Figure 16. Victims in road accidents in Romania's regions in 2015

We continue to present a situation of road accidents registered in Romania in a territorial profile, as well as by different criteria, such as: road users, age and seasonality registered. We consider this approach to be useful because it would contribute to a better understanding of the causes of these road accidents and would also help to establish concrete measures to reduce the number of accidents and to bring Romania at a medium level towards the EU.

In Figure no. 16 we have presented the number of road accident victims recorded on the level of Romania on the NATS II development regions for 2015. There are thus quite large variations between the regions of Romania, the average of the victims per region being 4600 and the coefficient of variation between regions 18.38%. Compared to the population of the regions, the average is 1864 victims per million inhabitants and the variance coefficient of 10.99%.

Among the injured victims of road accidents are the deaths (fatalities) that are in absolute value at the level of Romania for 2015, they are shown in Figure no. 17.

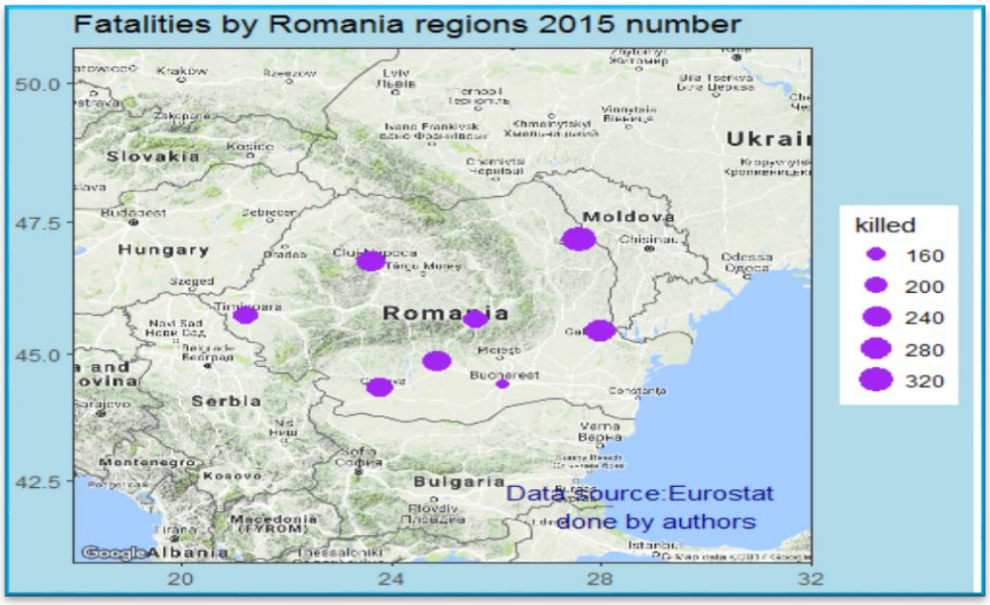

Figure 17. Fatalities by Romania's regions in 2015

Thus, at the level of the regions there is an average of 237 fatalities and a coefficient of variation that confines the spread between these regions of 24.56%. In other words, the spread of serious accidents resulting in deaths is much higher than road accidents. The gap between Romania and the EU average, presented in Figure no. 5, expresses a reduction trend and, on the other hand, Romania is still reporting a large proportion of deaths and hundreds of road accidents, 6,54% compared to only 2.39% as the EU average. This gap is a consequence of both the severity of the accidents themselves and of the health-care system in these situations. The structure of road fatalities on the main subjects: passengers, pedestrians and drivers for Romania during the period 1991-2015 is presented in Figure no. 18. By comparing the level between 1999 and 2015, we see a change in the majority weight, so if in 1999 the pedestrians had 47,73% of the structure preponderance, in 2015 it was taken by the drivers with 42,26%. In other words, there is a reversal of weights between pedestrians and drivers in conditions where passenger weight remains approximately constant. Analyzing the period 1999-2015, pedestrians had the highest share of fatalities of 39.91%, followed by drivers 36.12%, while passengers were 23.96%.

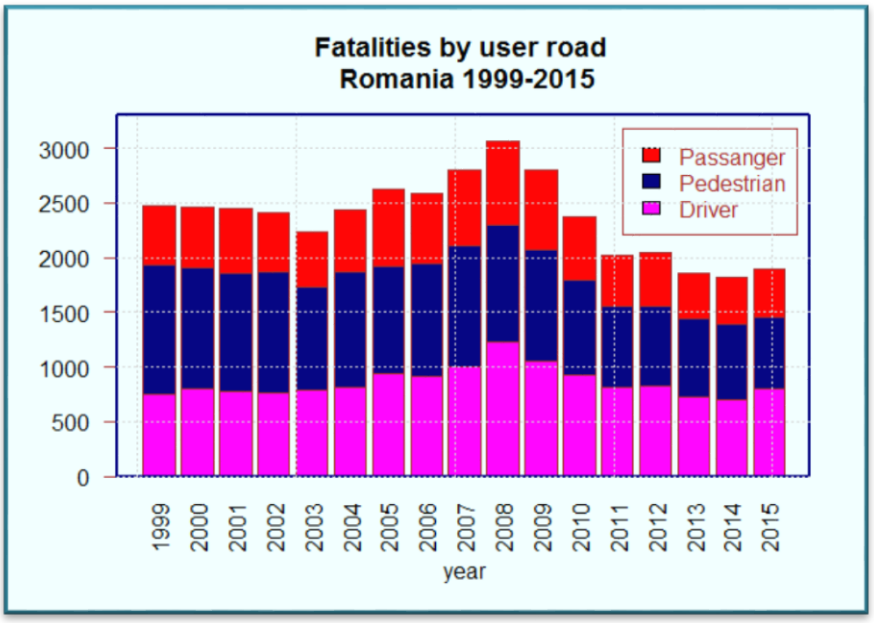

Figure 18. Fatalities by road users' in Romania between 1999-2015

Fatalities on the age groups are shown in Figures no. 19 and 20. Figure no. 19 shows the structures over the entire period between 1999-2015, while Figure no. 20 is presented for extreme periods. These figures show that fatalities are lower in younger age groups in favor of the older ones. In other words, an increase in the number of fatalities. This is due to better pedestrians' education for those people of scholar age, but also to increased attention for drivers carrying young people.

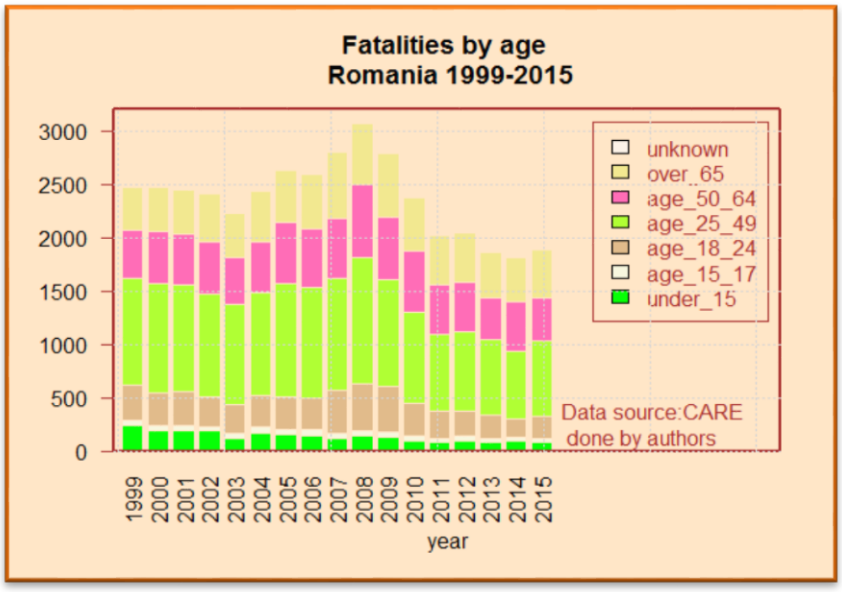

Figure 19. Fatalities by age in Romania between 1999-2015

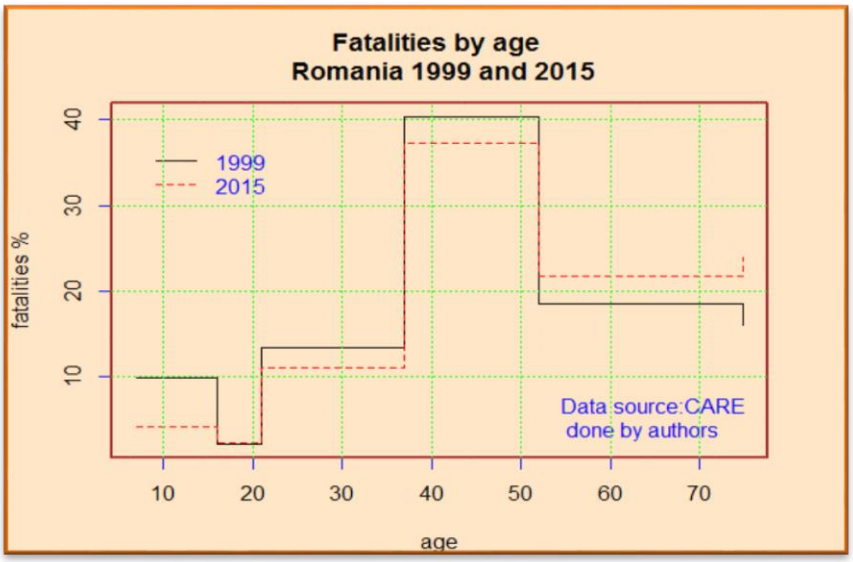

Figure 20. Fatalities by age in Romania between 1999-2015

A phenomenon related to road fatalities is represented by seasonality, that is the patchy distribution over a year. Thus, in the Figure no. 21 we represented the seasonal hints registered by our country for the period 2000-2015. There is a rather pronounced seasonality in which the coefficient of variation is 23.49%. The lowest level was recorded in February, and the highest in October.

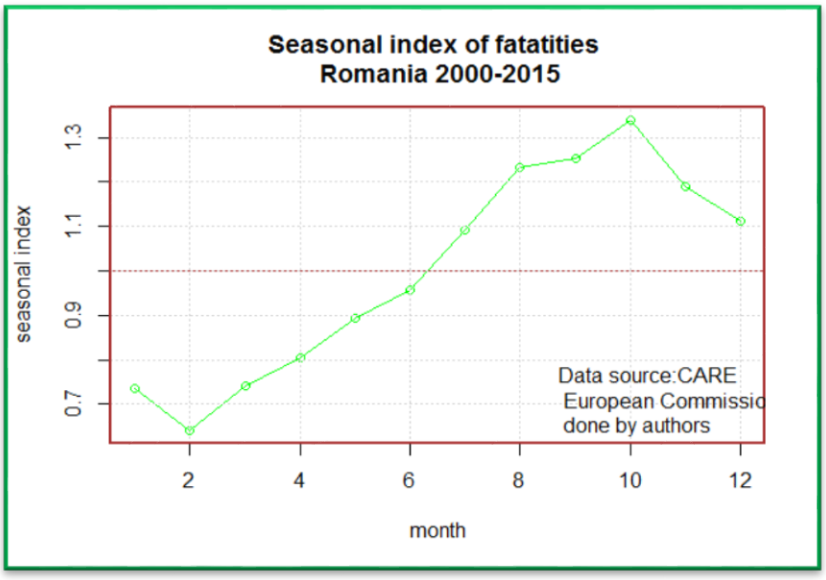

Figure 21. Seasonal index of fatalities in Romania between 2000-2015

This seasonality, although the tendency is unitary on the two urban and rural environments, shows different intensities, so that in the first part of the year the urban seasonality indexes are superior to the rural ones, in the second part of the year the situation reverses. The explanation is related to the harvest period in rural areas. See Figure no. 22.

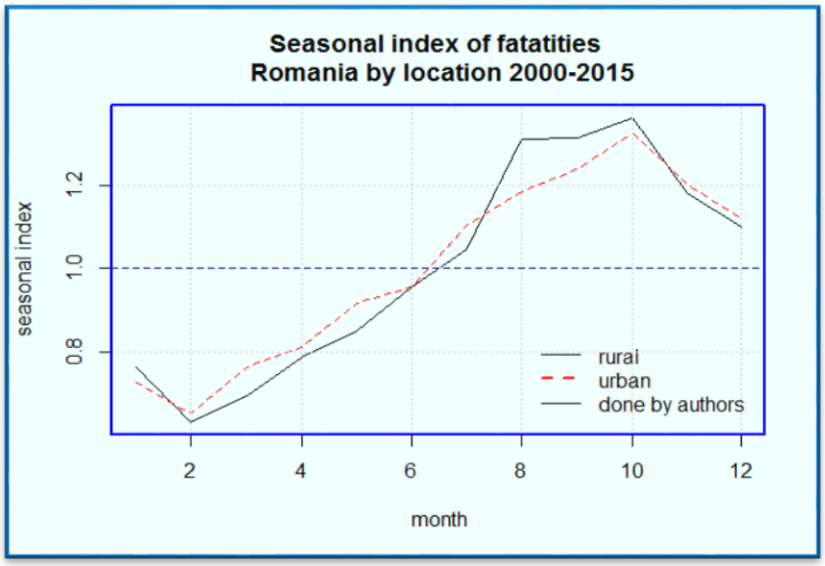

Figure 22. Seasonal index of fatalities by location in Romania between 2000-2015

Conclusion

Some of the problems that Romania faces with regard to road infrastructure, but also road traffic in general, have emerged from the above. Given the great gaps that separate our country from the EU countries, we propose a national strategy in this area, which will take into account the construction of a highway system as a priority, as well as the modernization of national roads. We consider it opportune to increase the education of the population in this field, especially among the pupils, by introducing some classes in the school curriculum.

Another aspect that should be addressed is the way of organizing driving schools, we are considering appropriate to increase the number of hours for obtaining a driving license and, at the same time, to increase the difficulty of the exam. Another solution might be involvement of local authorities in the liberation of public roads of end-of-life cars that strike on parking spaces. Also, we consider the obligation to build parking places by local authorities, but also by all commercial companies whose object of activity is to serve the population. We also propose conditioning of building permits for the construction of parking spaces.

We believe that an inventory of social innovation measures, domain specific and promotion of these measures is required. These are only a few aspects that should be considered in a future national strategy where specialists - both practitioners and theoreticians - should be attracted due to the complexity of the issues in this field.

References

Cozmei, V. (2017). *HotNews.ro Monday*, 6 March 2017, 12:12.

Dușa, A. & colab. (2015). *R cu aplicatii in statistica/R with applications in statistics.* Bucharest: Editura Universitatii din Bucuresti.

Păun, A. & Păun, M. (2009). *Analiza statistica folosind limbajul R/ Statistical analysis using the R language*. Bucharest: Matrix Rom.

Păun, M. (2016). *Notiuni de statistica aplicata cu exemple in R/Statistical notices applied with examples in R.* Bucharest: Matrix Rom.

https://ec.europa.eu/transport/road_safety/specialist/statistics_en.

http://ec.europa.eu/eurostat/data/database.

https://en.wikipedia.org/wiki/European_Union.

http://www.gandul.info/stiri/daca-nu-avem-autostrada-dacia-pierde-batalia-cu-marocul-avertizeaza-constantin-stroe-la-gandul-live-video-12077029.