



Investigation of the impact on road safety of increasing the speed limit on Greek motorways



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Background and Objectives

In June 2007, the speed limit on Greek motorways increased from 120 to 130 km/h.

The present research aims to investigate the impact on road safety of increasing the speed limit on Greek motorways.



Literature Review

Several previous studies were examined, including the work of the respective **Working Group of the IRTAD** of the OECD/ITF.

Increase of speed limit from 55 in 65 mph in *provincial* national roads of **USA** in April 1987 and increase in 70 and 75 mph in December 1995.

Increase of speed limit from 50 in 70 mph in **Hong Kong** in the period 1999 – 2002.

Decrease of speed limit from 90 in 70 km/h in the national roads of **Flanders** region of Belgium in 2001-2002.

Decrease of speed limit inside urban areas from 60 in 50 km/h in **Hungary** on May 1993 and increase by 10 km/h on May 2001 in roads outside urban areas.



Findings from the literature review

Increase of speed limit leads to increase in the number of accidents, fatalities, serious and slight injuries.

Decrease of speed limit leads to better results on road safety performance indicators.

The change of speed limit affects as well roads where the speed limits didn't change.

Most common analysis methods are before-and-after analysis and regression models.



Before-and-after analysis with control group

A **before-and-after** analysis with large control group was adopted .

Estimated effect = [Xa/Xb]/[Ca/Cb]

$$X^{2} = \frac{(Xa - Xb \cdot A)^{2}}{(Xb + Xa) A} \qquad [A = Ca/Cb]$$

where:

- Xa: the number of road accidents observed at the test site in the "after" period
- Xb: the number of road accidents observed at the test site in the "before" period
- Ca: the number of road accidents observed at the control site in the "after" period
- Cb: the number of road accidents observed at the control site in the "before" period



Analysis Method - Odds Ratio

Weighted Mean Effect

$$(WME) = \exp\left(\frac{\sum_{i} w_{i} \ln(\theta_{i})}{\sum_{i} w_{i}}\right)$$

95% confidence interval for the weighed effect

$$(\theta_{i}) = (\Psi/X)/(\Psi_{E}/X_{E})$$

$$w_{i} = \frac{1}{\frac{1}{\chi^{i}} + \frac{1}{\Psi^{i}} + \frac{1}{\chi^{i}_{E}} + \frac{1}{\Psi^{i}_{E}}}$$

$$\left(WMEexp\left(\frac{Z_{a/2}}{\sqrt{\Sigma_{i}}w_{i}}\right), WMEexp\left(\frac{Z_{1-a/2}}{\sqrt{\Sigma_{i}}w_{i}}\right)\right)$$



Data Collection

Data sources

- Hellenic Statistical Authority
- Egnatia Motorway Authority

Data for the period 2005-2010.

Variables examined

- Road accidents
- Fatalities
- Serious injuries
- Slight injuries
- Accidents including passenger cars
- Casualties by gender





Road Axes Considered

Motorways considered

- Athens Thiva (56 km)
- Athens Korinthos Tripoli (130 km)
- Kavala Evros (Egnatia Motorway-184 km)

Road network of the control group

- Total interurban road network (42.000 km)
- National roads network (10.500 km)

Before Period After Period

01/2005 - 05/2007 01/2006 - 05/2007

06/2007 - 12/2008 06/2007 - 12/2009 06/2007 - 12/2010



Before-and-After Accidents and Casualties

				Accidents		
		Athens - Thiva	Athens - Tripoli	Kavala-Evros	Interurban road network	National roads
Before	2006 - 05/2007	47	107	28	4.774	3.672
After	06/2007 - 2008	76	52	46	5.603	4.320

				Fatalities		
		Athens - Thiva	Athens - Tripoli	Kavala-Evros	Interurban road network	National roads
Before	2006 - 05/2007	6	34	13	1.223	924
After	06/2007 - 2008	19	16	13	1.357	1.046

		Serious injuries														
		Athens - Thiva	Athens - Tripoli	Kavala-Evros	Interurban road network	National roads										
Before	2006 - 05/2007	7	24	9	1.038	782										
After	06/2007 - 2008	10	9	17	1.245	869										

				Slight injuries		
		Athens - Thiva	Athens - Tripoli	Kavala-Evros	Interurban road network	National roads
Before	2006 - 05/2007	65	147	27	5.854	4.597
After	06/2007 - 2008	86	61	48	6.763	5.274

Analysis Results (1/2)

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Analysis Results (2/2)

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× No data

Conclusions (1/2)

Athens - Tripoli

Statistically significant reduction in accidents and fatalities,

Mainly atributed to significant infrastructure improvements in the sections Athens – Korinthos and Athens – Tripoli.

Kavala - Evros (Egnatia Motorway)

No statistically significant increase in accidents and fatalities.

No significant infrastructure changes.



Conclusions (2/2)

Athens - Thiva

Statistically significant increase in the number of fatalities only for a year after the increase of the speed limit.

No significant infrastructure changes before 2009.

Increase of speed limit leads to:

- increase in the number of fatalities on motorways with lower geometric characteristics and higher traffic volumes,
- no increase in the number of fatalities on motorways with higher geometric characteristics and lower traffic volumes.



Discussion

- It is important to know and consider in advance all types of consequences when deciding to increase speed limits, especially those related to road safety.
- The use of international experience provides useful guidance, but specific local studies are necessary.
- The consideration of speed measurements before and after the new rules might provide more insight on the effect of the speed limits change.
- Any change of speed limits should be considered in relation to the specific road geometric characteristics.







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