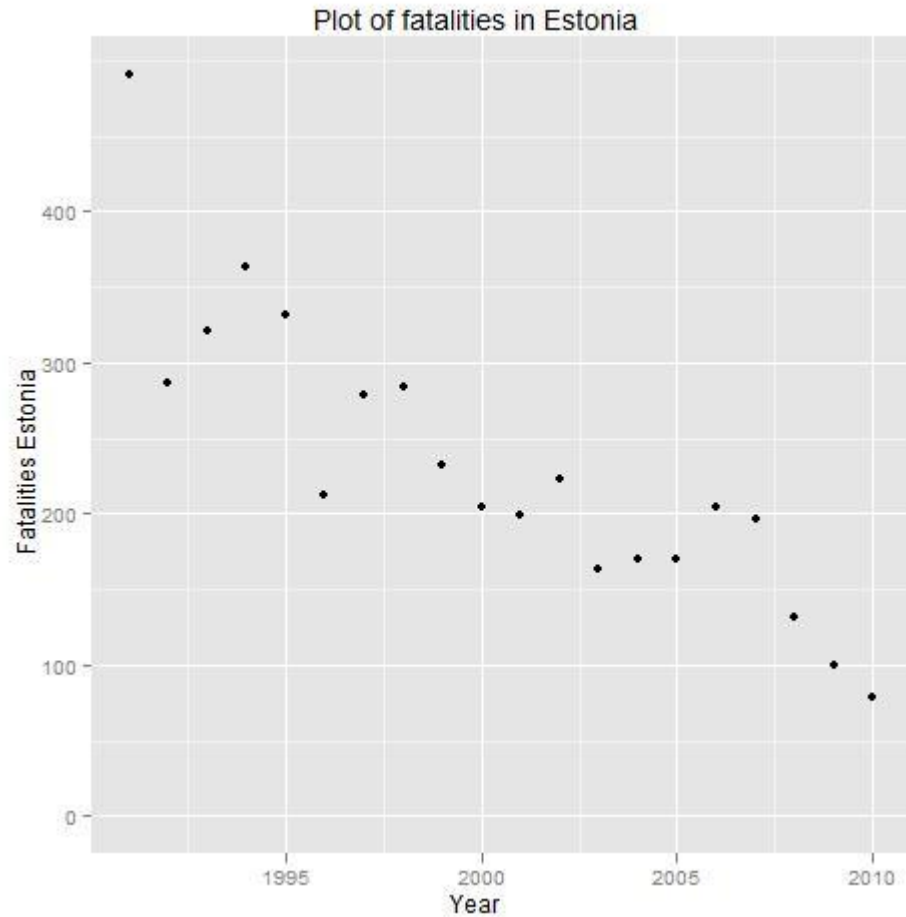


## Estonia

### Fatalities



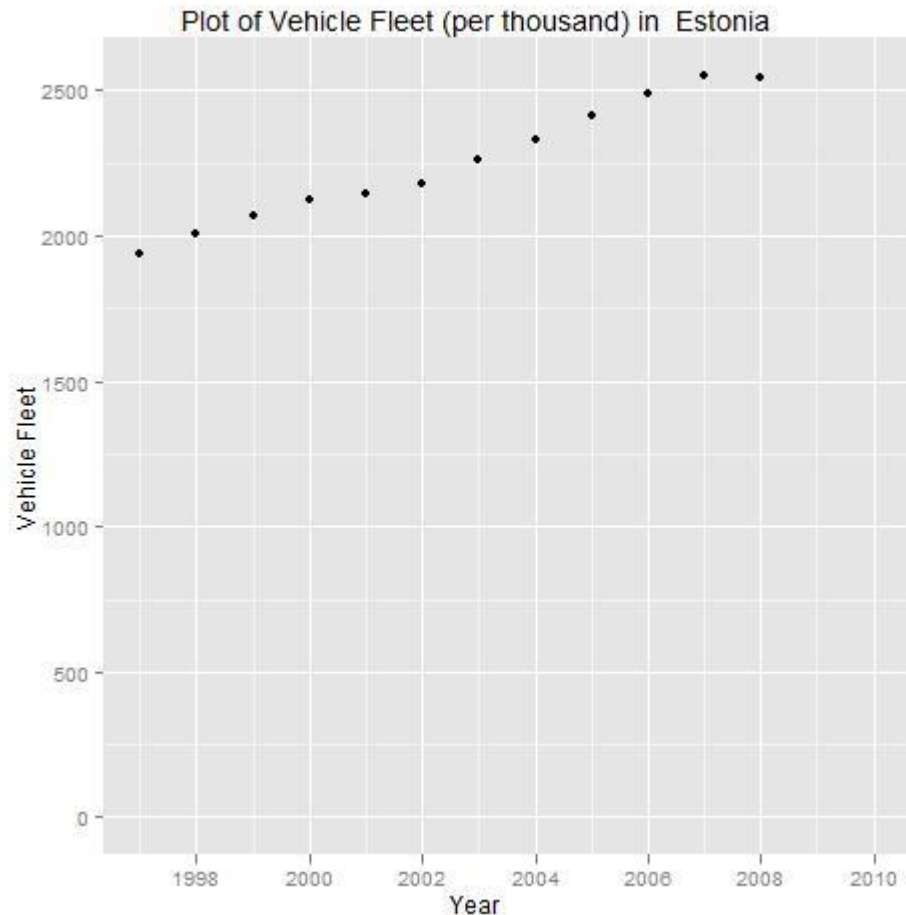
- The plot shows the number of fatalities in Estonia from 1991 to 2010. However, given the data restrictions concerning mobility data, the period 1997 to 2010 is used in the analyses.
- In general, there is a decreasing evolution in the number of fatalities. Nevertheless, during the last decade, the numbers in 2002, 2006 and 2007 were rather high.



# Road Safety Development - Estonia

## Vehicle fleet

- The number of fatalities normally depends strongly on a measure reflecting the amount of traffic. For Estonia, vehicle fleet data are considered.



The vehicle fleet in Estonia has increased from year to year in the period 1997-2007.

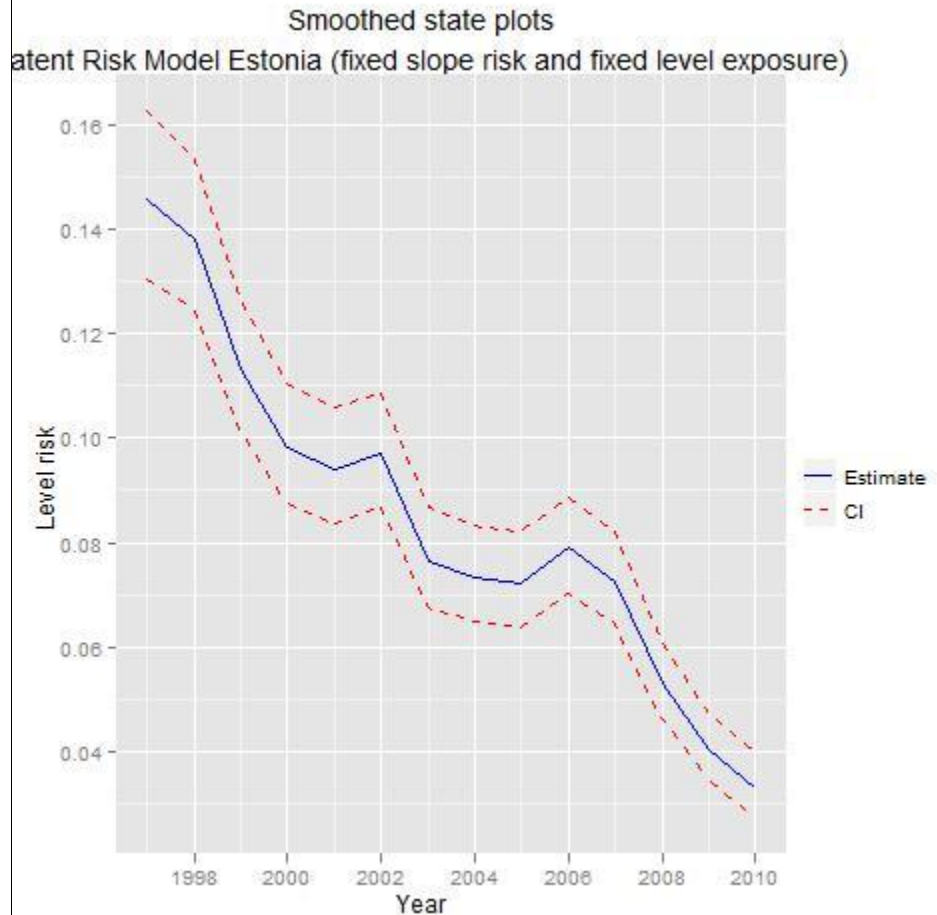
- Yearly data are obtained from Eurostat and are available for the period 1997 to 2008.
- The plot shows a gradual increase over the years, except in 2008.
- There is a significant relation between the development in vehicle fleet and the annual fatality numbers in Estonia.



# Road Safety Development - Estonia

## Fatality Risk

- The fatality risk is defined as the number of fatalities per thousand ( $10^3$ ) vehicles.
- Estimation model – technical definition:
  - o Latent Risk Model [1,2].
  - o Fixed level exposure, fixed slope risk.
- CI: 68% confidence interval.



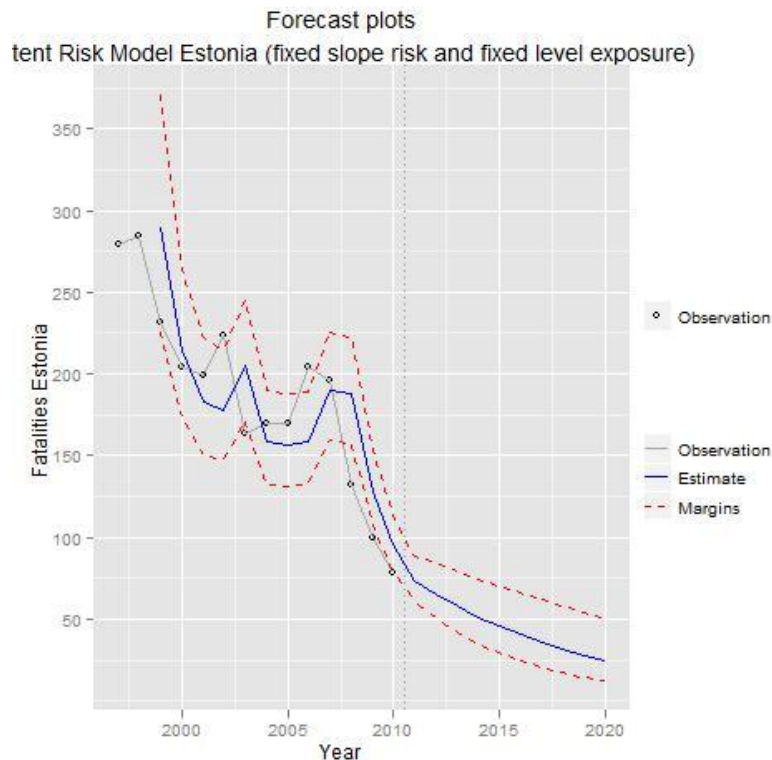
- The risk for fatalities in Estonia has reduced from 0.146 per thousand vehicles in 1997 to around 0.034 in 2010.



# Road Safety Development - Estonia

## Forecasts to 2020

- If road safety is improved at the same rate as previously and the past development of mobility continues, the following is to be expected for the number of fatalities in 2020:



If RS efforts continue at the same level, the expected number of fatalities in 2020 is 25.

### Forecast of road traffic fatalities in Estonia up to 2020

Year	Prediction	Lower CI	Upper CI
2011	74	51	107
2012	65	40	108
2013	58	31	108
2014	51	25	108
2015	46	19	107
2016	40	15	106
2017	36	12	105
2018	32	10	104
2019	28	8	103
2020	25	6	103

### Disclaimer

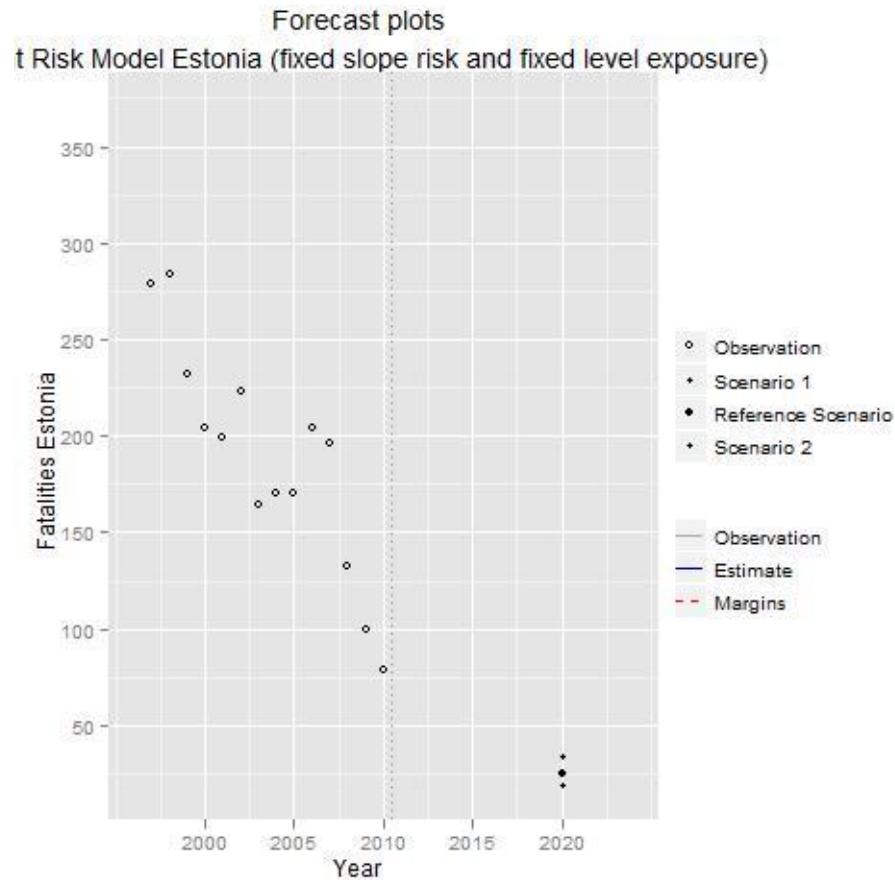
- Statistical forecasting does not offer a definite prediction of what is *actually* going to happen in the future.
- The estimates are based on the “business as usual” assumption: no *principal* changes between past and future development.
- Even in these conditions future outcomes are uncertain. This uncertainty is represented in the confidence intervals (plotted in the red margins: 68%; printed in table: 95%).



# Road Safety Development - Estonia

## Scenarios

- The uncertainty about the development of the fatalities observed in Estonia is partly due to the development in vehicle fleet.
- To illustrate that, three point-estimates for fatalities in Estonia in 2020 are plotted assuming three different vehicle fleet scenarios.
  - o Reference: continuation of development, i.e.: decrease in the number of vehicles (forecasted value)
  - o Scenario 1: increase (forecasted value + 1 standard deviation)
  - o Scenario 2: decrease (forecasted value - 1 standard deviation)



### Mobility scenarios

	<i>Vehicle fleet (thousand)</i>	<i>Road traffic fatalities</i>
<i>Most recent situation:</i>	2544 (2008)	79 (2010)
<i>Prediction 2020 according to mobility scenarios:</i>		
- Further decrease	2370	25
- Growth	3274	34
- Stronger reduction	1716	19



## References

- [1] Dupont & Martensen (Eds.) 2012. Forecasting road traffic fatalities in European countries. Deliverable 4.4 of the EC FP7 project DaCoTA.
- [2] Bijleveld F., Commandeur J., Gould P., Koopman S. J. (2008),. Model-based measurement of latent risk in time series with applications. Journal of the Royal Statistical Society, Series A, 2008.
- [3] EC National Expert for road accident statistics and road safety performance indicators.
- [4] Martensen & Dupont (Eds.) 2010. Forecasting road traffic fatalities in European countries: model and first results. Deliverable 4.2 of the EC FP7 project DaCoTA.
- [5] Commandeur, J. & Koopman, S.J. (2007) An Introduction to State Space Time Series Analysis. Oxford University Press.

