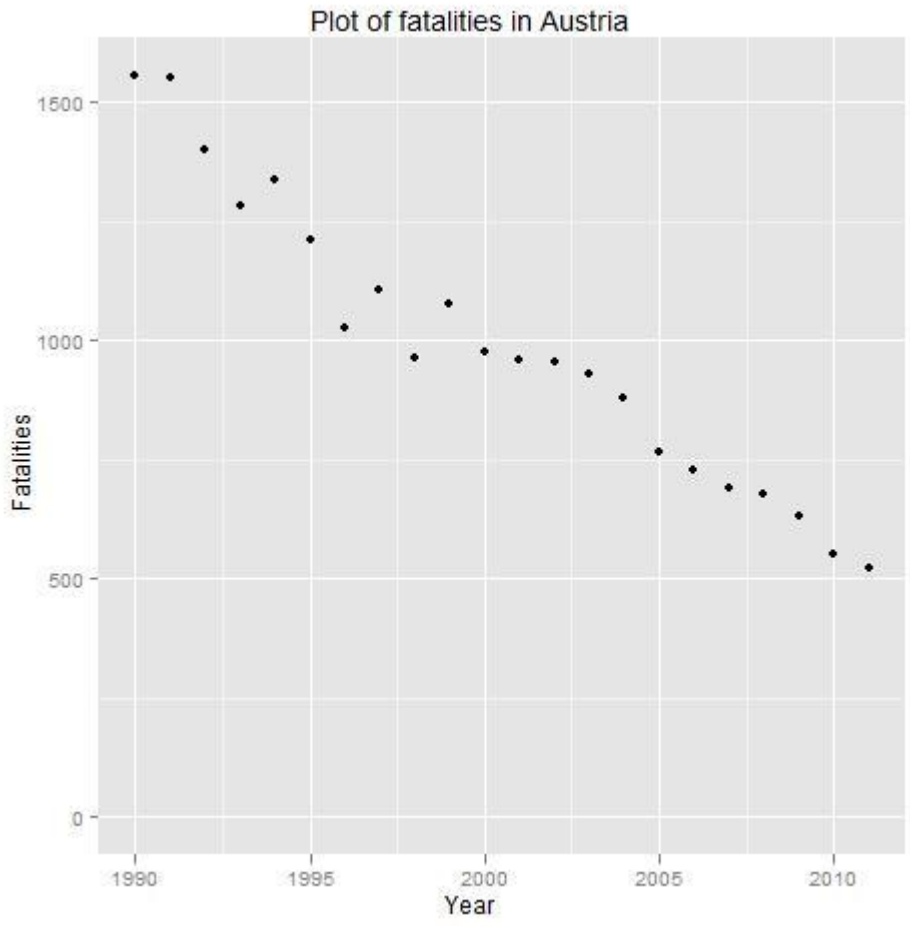
# Austria

## Fatalities

Since 1990, the annual number of fatalities has decreased by 3% per year on average.




- The number of fatalities observed in 2011 (523) is 3.33 times lower than in 1990 (1558).

### Registration of fatalities

- A fatality is defined as a death occurring within 30 days following an accident.

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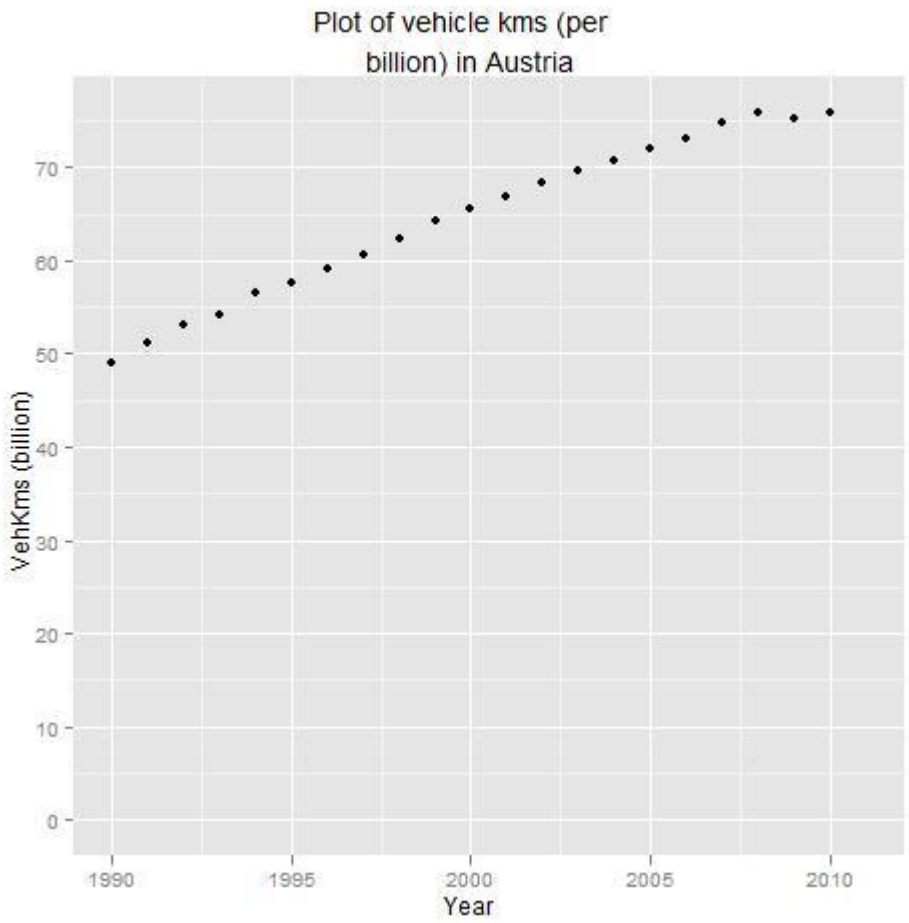
# Road Safety Development - Austria

## Traffic Volume




Mobility has been regularly increasing in Austria, but stagnated in 2009-2010.

- The number of fatalities depends strongly on the amount of traffic (exposure). To forecast the fatalities, the development of exposure has to be forecasted first.
- The selected measure for traffic volume is the annual vehicle kilometres (in billions). This data is available in Austria from 1990 up to 2010.
- Development:
  - From 1990 up to 2008: regular increase
  - 2009 - 2010: stagnation.
- No clear relation could be established between the development of mobility and that of the fatalities in the case of Austria.

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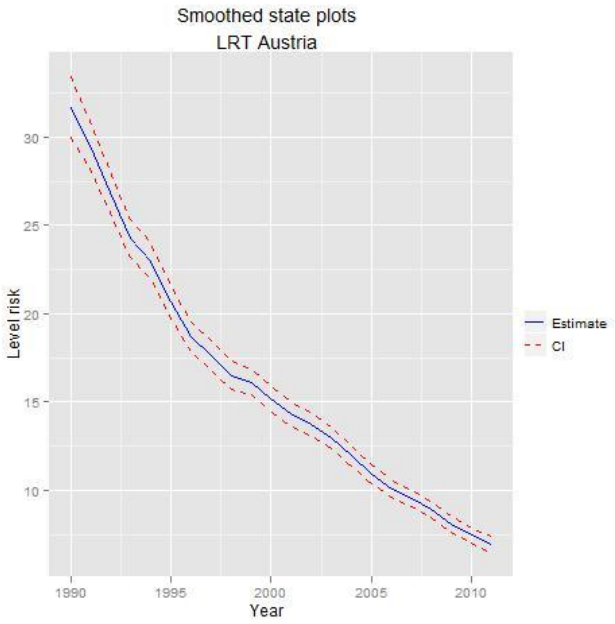
# Fatality Risk

- The fatality risk is the number of fatalities per billion ($10^9$) vehicle kilometres.
- Estimation model – technical definition:
  - Latent Risk Model [1,2]
  - Stochastic level and slope exposure, level and slope risk.
- CI: 68% confidence interval




The fatality risk has been decreasing by 6-7% yearly

- The trend starts around 32 fatalities per billion vehicle kilometres to end at around 3 fatalities per billion vehicle kilometres in 2011. In other words, the risk estimated in 2011 is about 10 times less as it was in 1990.
- This amounts to a mean decrease of 6 to 7% per year.

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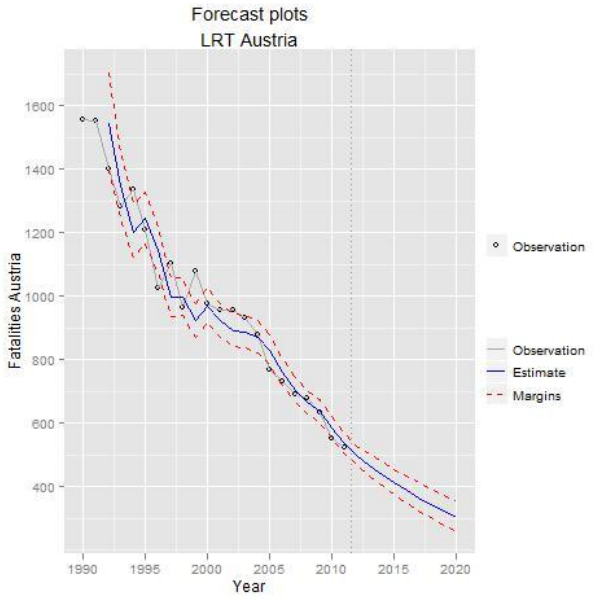
## Forecasts to 2020

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




If RS efforts continue at the same level, 304 fatalities are to be expected in 2020.

### Forecast of road-traffic fatalities in Austria up to 2020

| Year | **Prediction** | Lower CI | Upper CI |
|---|---|---|---|
| 2012 | **497** | 442 | 559 |
| 2013 | **468** | 405 | 540 |
| 2014 | **440** | 372 | 520 |
| 2015 | **414** | 342 | 501 |
| 2016 | **389** | 314 | 482 |
| 2017 | **366** | 289 | 463 |
| 2018 | **344** | 266 | 446 |
| 2019 | **324** | 244 | 429 |
| 2020 | **304** | 225 | 412 |

### 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%).

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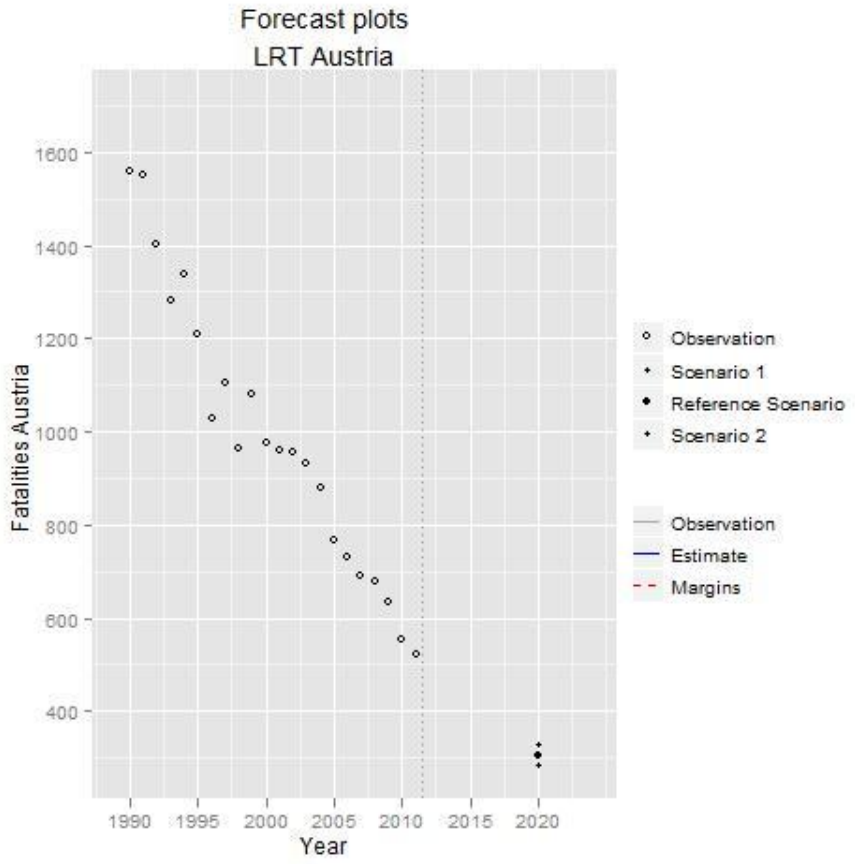
## Scenarios

- The uncertainty about the development of the fatalities observed in Austria is for a good part due the development in traffic volume.
- To illustrate that, three point-estimates for fatalities in Austria in 2020 are plotted, assuming three different scenarios for traffic volume:
  - Reference: continuation of development (forecasted value)
  - Scenario 1: stronger growth (forecasted value + 1 stand. deviation)
  - Scenario 2: stagnation (forecasted value - 1 standard deviation)




### Scenarios for Traffic Volume

| | *Vehicle kilometers (billions)* | *Road traffic fatalities* |
|---|---|---|
| | | |
| ***Situation 2010:*** | 76 | 523 |
| | | |
| ***Prediction 2020 according to mobility scenarios:*** | | |
| - Continuation of development | 80 | 304 |
| - Stronger development | 88 | 327 |
| - Weaker development | 74 | 283 |

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# References

[1] EC National Expert for road accident statistics and road safety performance indicators.

[2] Dupont & Martensen (Eds.) 2012. Forecasting road traffic fatalities in European countries. Deliverable 4.4 of the EC FP7 project DaCoTA.

[3] 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.

[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.