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A8 Effects of Weather and Climate Change on Road Transport

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Welfare effects of adverse weather through travel time loss for commuting trips

Objectives
- To investigate the impacts of adverse weather on the speed of car commuting trips
- To estimate the welfare effects associated with travel time loss through adverse weather

Data
CBS/DVS: Transportation survey for 1996 (OVG/MON)
- More than 600,000 observations
- Survey covers the entire Netherlands
- 77 variables including personal characteristics and trip characteristics

KNMI: Weather Report for 1996
- Hourly weather data for each day in 1996
- Recorded by 39 stations, covering all 458 municipalities of the Netherlands
- Including variables like temperature, wind speed, amount and duration of precipitation, etc.

Results
- Snow reduces speed by about 8 percent
- Commuting trips made during strong winds are about 3 percent slower
- Rain causes only a minor reduction in speed
- The interaction effect of rain and rush hours shows a 2.3 percent reduction in speed
- Commuting trips made during rush hours in congested areas are substantially slower when it rains; speed reductions for these trips range between 10 and 15 percent

Welfare effects of adverse weather through travel time loss
- In general, welfare costs through time loss are close to negligible except for snow
- Welfare effect of snow through time loss is around 0.25 € per commuting trip
- Welfare effect of rain through time loss is around 0.88 € per commuting trip (during rush hour on congested roads)

The impact of weather conditions on travel demand and mode choice decisions

Objectives
- Analyse the impact of weather on mode choice decisions
- Analyse the impact of weather on total transport demand

Data
- CBS/DVS: OVG/MON for 1996
- KNMI weather database for 1996

General conclusions
- Limited substitution between car and public transport
- People use the car and public transport more often in cold and extreme cold temperatures
- Individuals switch from bicycle to car as temperatures increases above normal temperatures (0-10o C); At extreme temperatures people use less bicycle, and more car and public transport
- The effects of wind are generally small, but the use of the bicycle decreases sharply at wind speeds higher than 6 Bft
- As precipitation increases, people reduce bicycle use and increase use of car and public transportation

Adverse weather conditions, congestion and road safety

Objectives
- Analyse the impact of weather on congestion and the number and severity of traffic jams
- Analyse the effects of weather on the number and severity of traffic accidents
- Analyse the interaction between congestion and traffic accidents and the intermediating role of weather

Data
- Traffic counts, traffic speed and accident data for the Dutch road network for 2000-2005 (DVS)
- Weather database for 2000 to 2005 (KNMI)