

**RAND**

*Audit of Car Ownership  
Models*

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*Prepared for the  
Transport Research Center (AVV) of the Netherlands Ministry  
of Transport, Public Works and Water Management*

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## Preface

RAND Europe has carried out a research project on car ownership modelling, called 'Audit of car ownership models', for the Transport Research Centre (AVV) of the Dutch Ministry of Transport, Public Works and Water Management.

In this report, a review was presented of existing models for car ownership. This review contains a description and comparison of existing Dutch car ownership models and a review and comparison of recently developed models in the international literature and models used in practice. The provision of this review was one of the objectives of this project. The other objective was to recommend on directions for potential development for improving the AVV car ownership models.

The car ownership model that AVV uses for most applications is the so-called FACTS model (Forecasting Air pollution through Car Traffic Simulation). FACTS also provides the future total number of cars that is used as an external total in the Dutch national Model System (LMS) for traffic and transport.

The background of this audit is the desire of AVV to obtain information on the basis of which a well-founded decision can be made on the development of an improved car ownership model, that can produce robust and sensible car ownership forecasts for all kinds of variants of variabilisation of the road tax (MRB) and car purchase tax (BPM).

As part of this project, a number of policy advisers was interviewed about what types of outputs are required from a car ownership model, what should be the forecasting horizon and what should be the policy variables to be simulated.

## Summary

We recommend to develop a new model system for predicting car ownership in The Netherlands. The preferred model system consists of:

- Duration models for the time between vehicle transactions (and the type of transaction: disposal, replacement, acquisition, also scrappage) to explain the total number of cars. An alternative option for this would be a Markov-type panel model.
- Vehicle type choice models for the choice of a brand-model-vintage alternative for all vehicle transactions that involve purchasing a(nother) car. These choice alternatives can be aggregated to get the composition of the fleet in terms of most of the required distinctions. Some less important distinctions need to be made by a post-processing procedure.
- Regression equations for the use of every car in the household, measured in terms of annual kilometrage, or through a logsum linkage with the national transport model system, LMS.
- A micro-simulator for 'birth' and 'death' of households and transitions between households types over time; a simpler but less consistent (in terms of dynamics) alternative would be to reweigh a given sample of households in each time period.
- Possibly a model for the number of business cars (company-owned and lease cars), depending on (sectoral) economic development, which need to be allocated to households. Private car ownership could be made conditional on the outcome of this.
- An allocation procedure to the 1308 LMS zones (also post processing).

Such models have been developed before, particularly as components of the Dutch Dynamic Vehicle Transactions Model (DVTM) and/or the model for the likely penetration of electric and hybrid cars for California.

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