

European second-hand car market analysis

Final Report

Contract Number
No. 07.0307/2009/549021/SER/C5
European Commission - DG Climate Action

Darmstadt, 24.02.2011

Authors:

Dr. Georg MEHLHART (Öko-Institut e.V.)
Cornelia MERZ (Öko-Institut e.V.)
Lars AKKERMANS (TML)
Jørgen JORDAL-JØRGENSEN (COWI)

Öko-Institut e.V.

Freiburg Head Office
P.O. Box 17 71
79017 Freiburg, Germany
Street Address
Merzhauser Str. 173
79100 Freiburg, Germany
Phone +49 (0) 761 - 4 52 95-0
Fax +49 (0) 761 - 4 52 95-88

Darmstadt Office

Rheinstr. 95
64295 Darmstadt, Germany
Phone +49 (0) 6151 - 81 91-0
Fax +49 (0) 6151 - 81 91-33

Berlin Office

Schicklerstraße 5-7
10179 Berlin, Germany
Phone +49 (0) 30 - 40 50 85-0
Fax +49 (0) 30 - 40 50 85-388

We wish to thank all experts who contributed valuable information to this study. These contributions from national institutions or agencies, independent experts and the European Commission were essential for the findings of this report.

Contract

No. 07.0307/2009/549021/SER/C5

European Second Hand Car Market Analysis

Client:

European Commission - DG Environment

Directorate C: Climate Change & Air

Unit C5: Energy & Environment

since Feb 2010 the project moved to:

European Commission - DG Climate Action

Directorate A: International & Climate Strategy

Unit A4: Strategy & Economic Assessment

The content of this report does not necessarily reflect the official opinion of the European Commission or other European institutions.

Contractor :

Öko-Institut e.V. – Institut für angewandte Ökologie

Merzhauser Str. 173; 79100 Freiburg; Germany (*Chapter 1 and 2*)

Transport & Mobility Leuven

Vital Decosterstraat 67A bus 0001; 3000 Leuven; Belgium (*Chapter 3 and 4*)

COWI A/S

Parallelvej, 2800 Kongens Lyngby; Denmark (*Chapter 2.3.4*)

The project team does not accept any liability for any direct or indirect damage resulting from the use of this report or its content.

Executive Summary

1. Introduction

The reduction of greenhouse gas emissions and other emissions from the transport sector is a highly relevant issue at European level. In order to establish a coherent and effective European policy in this field it is vital to have sound information on the composition of the vehicle fleet in Europe. In the passenger car sector in particular, knowledge concerning the cross-border trade of used vehicles and their characteristics (age, fuel, motor, emission class, etc.) and usage patterns (e.g. vehicle kilometres as a function of age) is needed.

Against this background, the objectives of the study were to examine:

- cross-border trade of used vehicles (M1+N1) in the EU 27 (see Chapter 2)
- usage patterns of vehicles (see Chapter 3)

Improved knowledge in these two fields will contribute to a better understanding of the fleet composition and its evolution in the EU Member States, thus providing valuable background data for modelling. This shall improve the prediction of fleet emissions and help the European Commission (DG Climate Action) to deduce suitable policy measures for the reduction of these emissions in view of local air pollution and global climate change.

The scope of the study is limited to passenger cars (M1) and light utility vehicles (N1) and the time frame covered is 2005 to 2010.

2. Cross-border trade of used vehicles

2.1. Data collection and results

Data on imports and exports of used vehicles to and from the European Union and between EU Member States were collected from international and national sources.

Used vehicle imports/exports to and from EU 27

The data from the Eurostat Foreign Trade Statistics (FTS) for extra-EU 27 trade is identified as a reliable source. Referring to FTS data and data from the European Automobile Manufacturers' Association (ACEA) the vehicle entries and exits as well as the vehicle stock for EU 27 are displayed in Figure 1 for 2008.

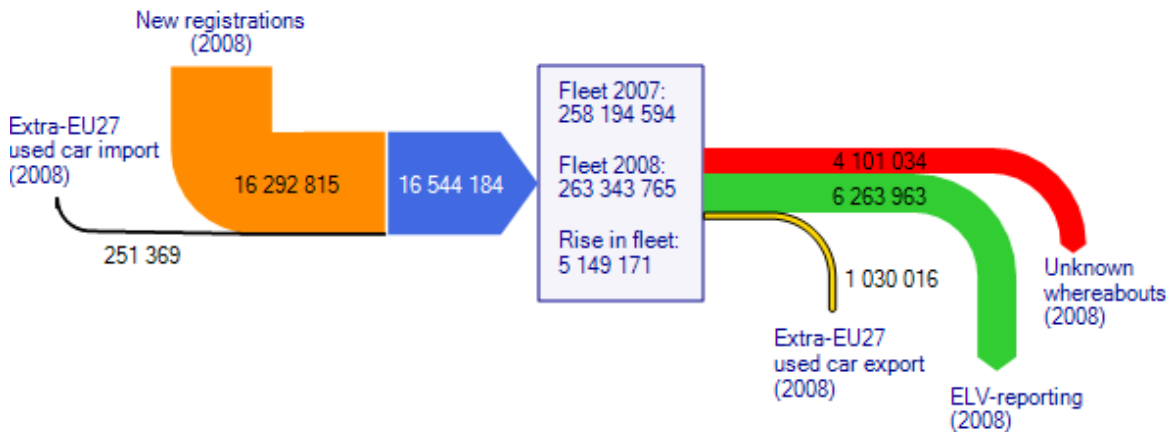


Figure 1: Vehicle entries and exits of the EU 27-fleet for 2008 [Source: Eurostat, ACEA]

An analysis of the data showed that the majority of the “unknown whereabouts” should be considered as scrapped or hoarded within EU 27 and that only a minority of “unknown whereabouts” is exported as used vehicles or as ELV used for spare parts.

Used vehicle imports/exports within the EU 27

Data for used vehicle imports and exports between the EU Member States are more difficult to obtain. On the international level, the data from the Eurostat FTS for intra-EU 27 trade is unsuitable for describing the cross-border trade of used vehicles within Europe because it is reported by economic operators beyond high thresholds only. Thus the data does not cover the entire market.

On the national level, data are available, but at different quality levels and dispersed at various national authorities / organisations. Contributions from 14 MS were obtained but only a minority provided detailed figures on origin and destination and/or on vehicle characteristics (fuel , age, emissions, kilometres, value). Among these Germany was the only country to refer to the re-registration data collected in the framework of the Directive 1999/37/EC on the registration documents for vehicles.

Germany was identified as the main exporter within Europe so that the German figures on export (and abroad re-registration respectively) and destination provide the order of magnitude of the import for several other countries.

Countries which provided more detailed data on the used vehicle characteristics for several consecutive years are the Czech Republic, Hungary, Poland, Slovakia and Finland, all of which are net importing countries. Poland was identified as the largest importer by far in absolute numbers with more than 60 % of its imports coming from Germany. As an example, the Polish used vehicle import structure is displayed in Figure 2 as a function of age class and engine category.

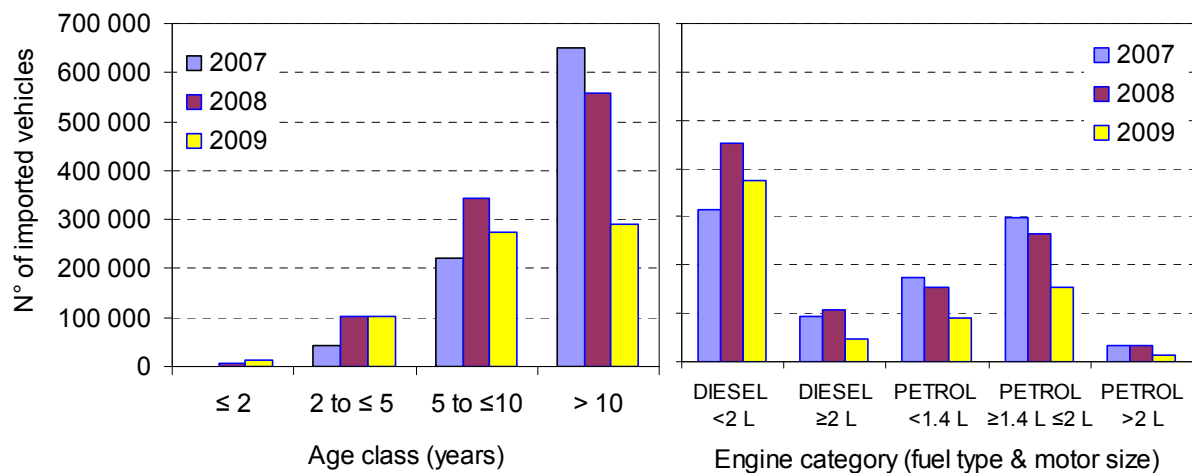


Figure 2: Imports of used cars to Poland by age, fuel type and motor size for 2007 to 2009

Relevance of the used vehicle import/export for national fleets

The numbers on extra- and intra- European used vehicle cross-border trade obtained from international and national sources were analysed and consolidated. The given figures for import and export needs to be considered as a minimum value and in reality more imports / exports are expected to occur. Six groups of countries can be identified for which used vehicle imports and exports have different levels of relevance:

- Group 1: With high relevance of imports ($\geq 60\%$ compared with the annual registration of new cars) and low relevance ($< 15\%$) of exports are BG, CY, CZ, GR, LV, MT, PL, RO and SK.
- Group 2: Imports are of medium relevance ($\geq 16\%$, $\leq 33\%$) and exports of small relevance ($\leq 2\%$) for FI, HU, IE.
- Group 3: DK has both medium imports and medium exports. It is not a typical importer or exporter but apparently is simply well integrated.
- Group 4: In the case of BE, NL and SI, imports are of medium relevance ($\geq 15\%$, $< 30\%$) and exports of high relevance ($\geq 60\%$; $\geq 52\%$ in the case of LU).
- Group 5: Imports are of low relevance ($< 15\%$) in the case of AT, DE, ES, FR, IT, PT, SE and UK. Germany, with its high share of exports (55%), is somewhat an exception in this group.
- Group 6: LT is seemingly an exception as it appears to be a shipment centre with high imports from EU 27 and high exports to extra-EU countries; in terms of net imports (around 155%) it is in the range of LV and GR.

A detailed overview of the consolidated trade numbers as well as the levels of relevance is given in Table 1. More details on sources and estimations are provided in the main report and Annex 5.

Table 1: Estimated relevance of imports and exports (M1 & N1) to the composition of the national fleets for 2008

Country	Import (M1+ N1)		Export (M1 + N1)		Compared to new registrations		
	Minimum intra EU-27 (Estimate)	Extra EU-27 (FTS)	Minimum intra EU-27 (Estimate)	Extra EU-27 (FTS)	New registrations (M1 + N1) source (ACEA)	Import (intra + extra EU) / new registrations	Export (intra + extra EU) / new registrations
PL	1 105 615	38 418	6 777	33 127	375 936	304%	11%
BG	151 407	13 059	281	1 140	55 236	298%	3%
LV	40 734	2 790	987	1 634	21 872	199%	12%
GR	397 558	648	427	179	289 500	138%	0%
SK	101 191	2 757	1 023	160	96 940	107%	1%
CZ	203 926	2 530	3 256	5 800	202 823	102%	4%
CY	8 909	15 576	86	65	28 444	86%	1%
MT	887	3 298	112	14	5 666	74%	2%
RO	222 323	984	44 239	86	307 409	73%	14%
EE	14 844	2 210	2 168	2 886	27 555	62%	18%
IE	56 000	3 024	939	119	179 770	33%	1%
FI	24 622	2 630	1 266	618	156 006	17%	1%
HU	28 600	218	1 507	1 691	174 837	16%	2%
DK	42 106	894	51 670	3 330	183 746	23%	30%
LU	16 662	39	28 486	1 044	56 387	30%	52%
BE	168 092	5 277	196 118	221 482	603 493	29%	69%
SI	19 945	304	2 432	47 600	78 857	26%	63%
NL	92 000	8 171	283 636	77 308	584 572	17%	62%
SE	24 000	8 438	16 488	5 754	293 251	11%	8%
AT	31 053	1 481	63 135	8 526	326 460	10%	22%
DE	178 323	54 326	1 557 774	274 621	3 313 565	7%	55%
ES	80 980	8 335	246 959	6 898	1 327 048	7%	19%
FR	97 980	5 632	249 460	29 993	2 509 219	4%	11%
PT	10 750	300	2 562	6 112	268 787	4%	3%
IT	64 236	3 387	388 936	23 976	2 385 564	3%	17%
UK	8 852	22 100	52 062	26 831	2 418 953	1%	3%
LT	252 435	44 543	8 853	249 022	25 217	1178%	1023%
EU 27	3 444 031	251 369	3 211 638	1 030 016	16 297 112	23%	26%
EU 15	1 293 214	124 682	3 139 918	686 791	14 896 321	10%	26%
EU 12	2 150 816	126 687	71 721	343 225	1 400 791	163%	30%
EU 11*	1 898 381	82 144	62 868	94 203	1 375 574	144%	11%

* without LT

≥ 0.15	Threshold 1
≥ 0.30	Threshold 2
≥ 0.60	Threshold 3

Indicators and economic drivers

One aim of the project is to examine indicators and economic drivers to be used for modelling or forecasting the level of import or export of used cars.

For test calculations the results of the previous Table 1 are used as values for net export. The limitations of this estimation, in particular the underestimation of the imports and exports, need to be kept in mind.

Four different economic drivers (“total final consumption of households” (see for example Figure 3), “GDP”, “final consumption of households for transport” and “Net disposable income of households”) were tested for their relevance on the import and export of used vehicles.

The main general observation for the import / export of used vehicles is that practically all new Member States have net import. The only exception is Slovenia where an effect of the nearby Balkan area (i.e. extra-EU 27 export) is likely. There seems to be a threshold of approx. € 12 500 total final consumption per capita, respectively € 20 000 GDP per capita above which export activities start to exceed imports.

However, no relevant correlation within the groups of EU 15 and EU 12 can be identified.

Other factors such as

- limitations of the data quality for the import and export of used cars,
- national regulations for re-registration,
- national tax regimes,
- national scrapping schemes,
- the (historical) regional connection to nearby extra-EU markets (e.g. SI) and
- national car industry connected to “home market”

and maybe others are likely to additionally influence the market so that no straight-forward correlation can be provided.

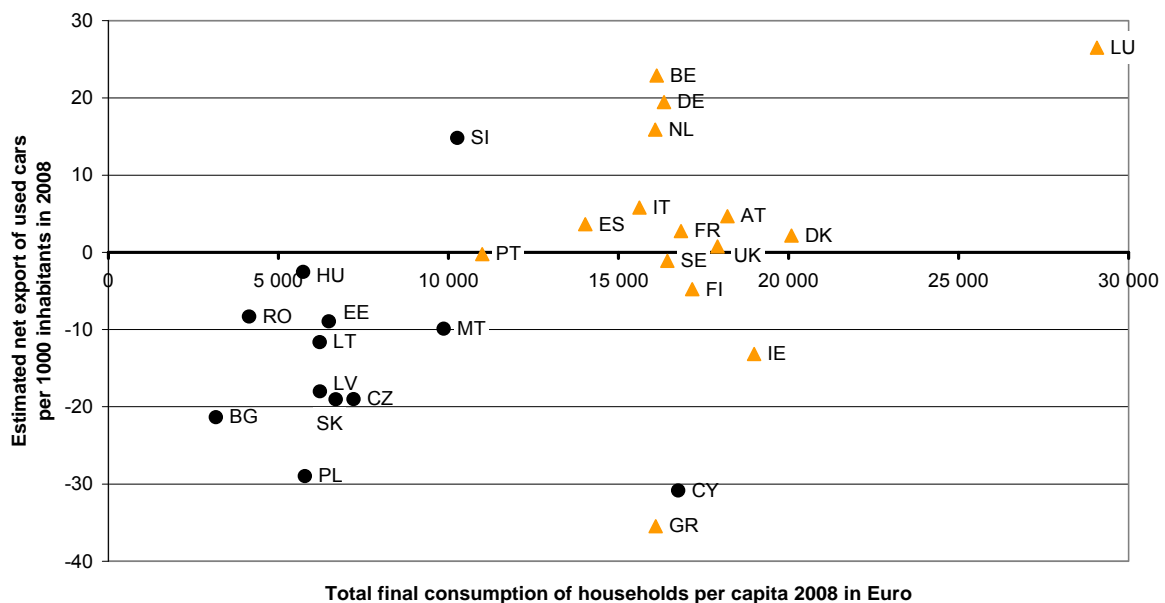


Figure 3: Net export of used vehicles (M1+N1) according to total final consumption of households

Scrappage rates

The prediction of the fleet evolution is carried out by means of a simple balance for two consecutive years and vehicle ages:

$$\text{FLEET}_{\text{year } n}^{\text{age } m} - \text{FLEET}_{\text{year } n-1}^{\text{age } m-1} = \text{IMPORTS}_{\text{year } n}^{\text{age } m} - \text{EXPORTS}_{\text{year } n}^{\text{age } m} - \text{SCRAPPAGE}_{\text{year } n}^{\text{age } m}$$

Besides inclusion of detailed information concerning the imports and exports of vehicles to/from the fleet, it is essential to make a statement concerning scrappage in order to predict the fleet evolution. In the context of this study the term scrappage consistently refers to effective scrappage only, i.e. ELV due to breakdown or accident.

Detailed balances of the fleet entries and fleet exits by vehicle age were carried out for Poland, Slovakia and the Czech Republic (for all of which more advanced data was available than it was the case for the other countries). However, these national fleet balances showed that based on the data currently available it is not possible to deduce reliable (national) scrappage rates as a function of the vehicle age; instead we found that according to our methodology it is likely that imports are between 60 % and 150 % higher than reported by the national sources. To some extent this might also be caused by incomplete de-registration, leading to an overestimation of the growth of the national fleet.

Generic European scrappage rate

In view of the shortcomings on the national level a scrappage rate based on the overall European fleet was developed. The model uses one-year age groups for vehicles up to 14 years of age. Vehicles aged 14+ years constitute one group.

Figure 3 shows the resulting average scrappage rate (“uncorrected”) for EU 23 as a function of age. For refinement of the function the (estimated) net exports to Bulgaria and Romania as well as extra-EU 27 net exports (from FTS) were included. However, the impact of such adjustment seems small (see “adjusted scrap rate” in Figure 4).

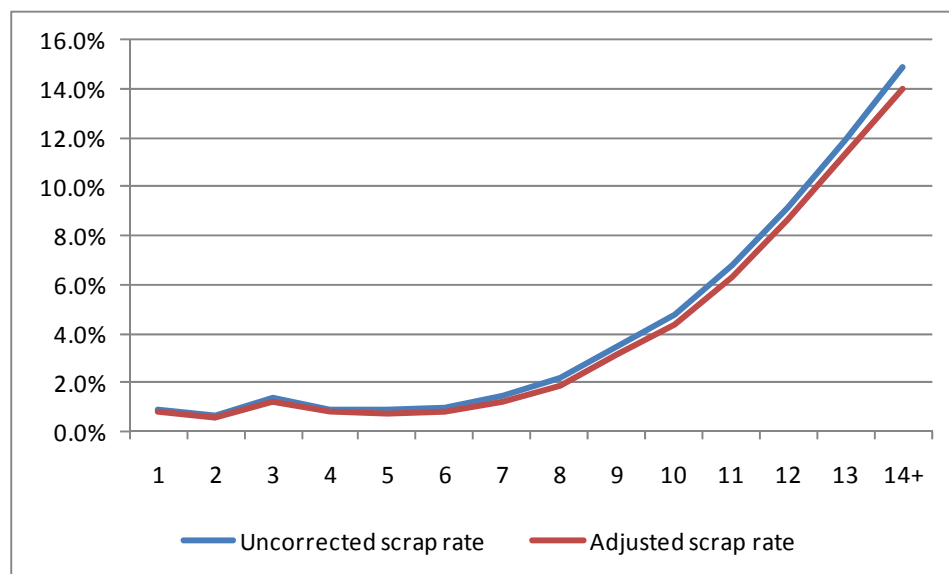


Figure 4: Scrappage rate for EU (M1+N1) by age (average for 2005-2009)

Assuming an equal scrappage rate for all European countries, the average European scrappage rate from Figure 4 can then be used to deduce the net import/export behaviour of the different Member States.

Figure 5 shows the import/export patterns by age (arranged in four groups for the sake of clarity). Details on the procedure as well as the calculated total net import/export numbers are provided in the main report.

The result clearly highlights the tendency that the EU 12 countries are net importing countries whereas the EU 15 countries are net exporters.

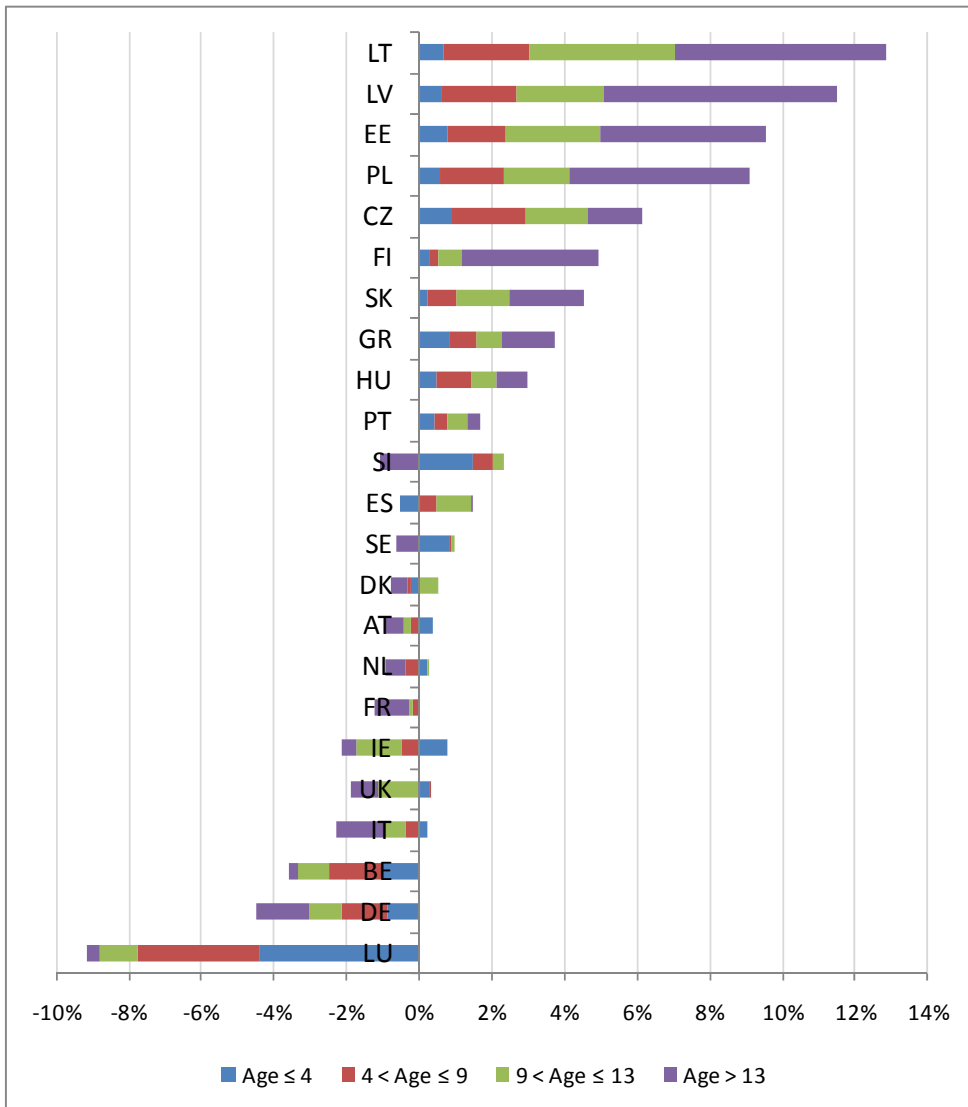


Figure 5: Net vehicle imports (and exports) (M1+N1) calculated as percentages of the national car fleet (average 2004 – 2009), adjusted for additional export
Note: Export reported as negative figures, import reported as positive figures.

2.2. Recommendations – Cross-border trade of used vehicles

Modelling and forecast

- For modelling purposes it is strongly recommended to separate the real “scrappage rate” from the “net import/export rate”. To distinguish this approach from earlier proposals (see FLEETS/TREMOVE) we recommend applying the following definitions:
 - “fleet exit rate” including scrappage and net import / export
 - “scrappage rate” considering effective scrappage only (i.e. ELV due to breakdown or accident).
- To model scrappage, we recommend – with respect to the current (incomplete) data situation – to use the generic European scrappage rate which was demonstrated to yield probable results (see Figure 4 and Figure 5 of this executive summary). Once the data situation on the national fleets and exports/imports as a function of age is more complete, detailed balances on the national level can be used to verify the underlying assumption of a constant scrappage rate for all Member States.
- As the data reliability is still weak, the intervals between model updates with empirical data should be reduced. A delay of five years and more is not appropriate.
- Regarding data on the national fleets the freely available international sources are found to be of limited reliability in particular when a breakdown by age is required. Hence, reference to national sources is recommended to ensure appropriate quality. Commercially available fleet data might be an additional source but licensing practices may limit their free use.
- Information on motor type/size, kilometres, emission class and economic value of traded used vehicles is comparatively rare. Should the situation not improve, we recommend relying on vehicle age as an indicator for emission classes and other characteristics.

Statistics

- The European data collection on the national vehicle fleets which is currently applied is not appropriate in terms of age classes aggregated to more than one year of age for a detailed evaluation of the fleet evolution and the derivation of scrappage rates.
- In particular the aggregate for older vehicles referring simply to “≥ 10 years” is not appropriate as for some countries the majority of the imported vehicles are found in this age class.
- In consequence we recommend establishing a database / collection with a breakdown of at least 16 age classes (a breakdown by single years of age up to ≤ 15 years, and one class >15 years).
(According to our experience, such a detailed breakdown is already available to the national registration authorities so that it is a question of aggregation and data management rather than a question of data collection.)
- Considering the current data situation it is a challenge to collect appropriate statistical information on characteristics (kilometres, engine, emission class, value)

of imported and exported used vehicles. Thus we recommend limiting data collection to information concerning the age of the imported/exported used vehicles (and as far as possible the fuel type). Other characteristics shall be directly collected from the usage patterns connected with the age as described below. It might be more promising to collect such information by means other than statistics (see below).

3. Usage Patterns

3.1. Data collection and results

An extensive literature review showed that little or no information on the subject is available. To improve the situation various public and private stakeholders (national administrations, public services, vehicle manufacturers, etc.) were contacted and given a survey for which seven distinct elements were identified:

- 1) annual and total vehicle kilometres travelled
- 2) vehicle age according to vehicle kilometres
- 3) annual vehicle kilometres according to vehicle age
- 4) vehicle price
- 5) road types used
- 6) vehicle occupancy rates
- 7) accident rates

Although a very diverse group of respondents from different Member States had been asked to fill in the questionnaire, very little data was collected. This was in particular the case when data was requested that allowed for the comparison of different vehicle ages, either in terms of years or vehicle kilometres. The general lack of data made a specific content analysis of the information collected through the survey impossible.

However, data were obtained from two alternative sources that serve as a test case for the analysis of the requested data:

- the Eurostat Transport database provided information relevant for “annual vehicle kilometres in relation to vehicle age” and “distribution of total vehicle kilometres travelled over vehicle age”
- the German Mobility Study (MiD, 2010) provided information relevant for “annual vehicle kilometres in relation to vehicle age” and “vehicle occupancy rate”.

An exemplary comparison of these data with data collected from the FLEETS database (used as input for the REMOVE model) in order to evaluate the need for improved data collection yielded the following results:

Comparison of Eurostat Transport and FLEETS/REMOVE data: annual vehicle kilometres

As a first test case, data provided by Eurostat Transport on annual vehicle kilometres was compared with data collected for the FLEETS project (reference year for both is 2008, REMOVE extrapolates fleet data from 2005 to 2008). When looking at this data, it becomes clear that the differences between data reported by Eurostat on the one hand and the data used in a model such as REMOVE, based on data from FLEETS, on the other

hand are very substantial. Whatever the reasons are for these differences, they warrant a high level of attention for future data use. A clear methodology for the collection of these data needs to be considered in the future to enhance comparability.

Comparison of German Mobility Study (2008) - FLEETS data: annual vehicle kilometres

As a second test case, data collected from a mobility study in Germany was compared with data collected for the FLEETS project. Again, sizeable absolute differences between reported data on the one hand and the data provided by FLEETS to a model such as TREMOVE on the other hand can be identified, albeit more pronounced for older vehicles. Similar to the first test case, a number of reasons can be potentially identified for this: the collection method used is different, the reporting system is different or there is a general error in one of the datasets.

3.2. Conclusions – Usage Patterns

The above-mentioned findings show that a more standardised structure for the collection of data related to usage patterns needs to be provided. A number of elements can be identified that may help improving data collection and quality:

- collection method
- respondent groups
- variable listings, including definitions.

The German Mobility Study (MiD, 2010) can be considered a good example for the collection of detailed mobility data and could provide an initial starting point for the creation of such a potential standardised structure. In addition with the continued introduction of internet at household level, new opportunities arise to collect mobility data.

As far as the comparison of Eurostat Transport data/data from the German mobility study with data from the FLEETS project is concerned, two major findings could be identified:

- in absolute terms, there are sizeable differences between annual vehicle kilometres that are reported or presented in different databases, projects or models. This should be a cause for caution when using these data. As a result of this, there is still a need for updated mobility data, collected using a carefully detailed and described methodology.
- In relative terms, it was found that the assumptions generally accepted in mobility models (a declining trend of annual vehicle kilometres, starting directly after the purchase of a new vehicle) are not necessarily mirrored by real-life mobility data (an increase in annual vehicle kilometres for the first 2 years and a decline only after that period).

These findings highlight the necessity for further collection of mobility data following a standardised methodology and research.

European second-hand car market analysis

Final Report

Contract Number
No. 07.0307/2009/549021/SER/C5
European Commission - DG Climate Action

Darmstadt, 24.02.2011

Authors:

Dr. Georg MEHLHART (Öko-Institut e.V.)
Cornelia MERZ (Öko-Institut e.V.)
Lars AKKERMANS (TML)
Jørgen JORDAL-JØRGENSEN (COWI)

Öko-Institut e.V.

Freiburg Head Office
P.O. Box 17 71
79017 Freiburg, Germany
Street Address
Merzhauser Str. 173
79100 Freiburg, Germany
Phone +49 (0) 761 - 4 52 95-0
Fax +49 (0) 761 - 4 52 95-88

Darmstadt Office

Rheinstr. 95
64295 Darmstadt, Germany
Phone +49 (0) 6151 - 81 91-0
Fax +49 (0) 6151 - 81 91-33

Berlin Office

Schicklerstraße 5-7
10179 Berlin, Germany
Phone +49 (0) 30 - 40 50 85-0
Fax +49 (0) 30 - 40 50 85-388

We wish to thank all experts who contributed valuable information to this study. These contributions from national institutions or agencies, independent experts and the European Commission were essential for the findings of this report.

Contract

No. 07.0307/2009/549021/SER/C5

European Second Hand Car Market Analysis

Client:

European Commission - DG Environment

Directorate C: Climate Change & Air

Unit C5: Energy & Environment

since Feb 2010 the project moved to:

European Commission - DG Climate Action

Directorate A: International & Climate Strategy

Unit A4: Strategy & Economic Assessment

The content of this report does not necessarily reflect the official opinion of the European Commission or other European institutions.

Contractor :

Öko-Institut e.V. – Institut für angewandte Ökologie

Merzhauser Str. 173; 79100 Freiburg; Germany (*Chapter 1 and 2*)

Transport & Mobility Leuven

Vital Decosterstraat 67A bus 0001; 3000 Leuven; Belgium (*Chapter 3 and 4*)

COWI A/S

Parallelvej, 2800 Kongens Lyngby; Denmark (*Chapter 2.3.4*)

The project team does not accept any liability for any direct or indirect damage resulting from the use of this report or its content.

Table of Contents

1	Introduction	1
2	Cross-border trade of used vehicles.....	2
2.1	International sources.....	3
2.1.1	Eurostat’s Transport Database	3
2.1.2	Eurostat’s External Trade Statistics (Comext)	4
2.1.2.1	Intra-EU 27 trade according to Comext.....	4
2.1.2.2	Extra-EU 27 trade according to Comext.....	8
2.1.2.3	Conclusion: Use of Comext data in the present study	11
2.1.3	Eurostat’s Waste Statistics (EDC-Waste) on End-of-Life Vehicles.....	12
2.1.4	Data from car associations as ACEA	13
2.1.5	Commercially available data	14
2.1.6	Previous studies as FLEETS and the revision of the FLEETS data in the most recent REMOVE update.....	15
2.2	National sources	15
2.2.1	Belgium	15
2.2.2	Czech Republic.....	16
2.2.3	Denmark.....	19
2.2.4	Germany	20
2.2.5	Estonia	23
2.2.6	Ireland	23
2.2.7	Spain	25
2.2.8	France	26
2.2.9	Italy.....	26
2.2.10	Luxembourg	28
2.2.11	Hungary.....	28
2.2.12	Netherlands.....	30
2.2.13	Poland	30
2.2.14	Slovakia.....	32
2.2.15	Finland	34
2.2.16	Sweden	35
2.2.17	Other countries.....	36
2.3	Detailed evaluation and results	37
2.3.1	Global fleet balance for EU 27	37
2.3.2	Relevance of cross-border trade for national fleet compositions in EU 27	39
2.3.3	National fleet balances and scrappage rates	43
2.3.3.1	Poland	44

2.3.3.2	Slovakia.....	48
2.3.3.3	Czech Republic.....	51
2.3.4	Derivation of an average EU 27-scrappage rate from data purchased from POLK	55
2.3.4.1	Method	55
2.3.4.2	Data.....	55
2.3.4.3	Passenger cars, M1	56
2.3.4.4	Light duty vehicles, N1	63
2.3.4.5	Passenger cars and light duty vehicles, M1 + N1	68
2.3.4.6	Adjustment for additional exports, M1 + N1	73
2.3.4.7	Discussion and comparison with other sources	79
2.3.5	Indicators and economic drivers	80
3	Usage Patterns	84
3.1	Literature review	84
3.2	Data collection.....	85
3.3	Data collected through the questionnaire	87
3.3.1	Item 1: Vehicle kilometres	87
3.3.2	Item 2: Vehicle age according to total vehicle kilometres	88
3.3.3	Item 3: Fleet vehicle kilometres according to vehicle age.....	89
3.3.4	Item 4: Annual vehicle kilometres according to type of road.....	89
3.3.5	Item 5: Vehicle occupancy rate	90
3.3.6	Item 6: Vehicle purchase price.....	91
3.3.7	Item 7: Fatal accidents.....	91
3.4	Data collection parallel to the questionnaire.....	92
3.4.1	Eurostat Transport database.....	92
3.4.1.1	Item 1: Vehicle kilometres (annual average).....	92
3.4.1.2	Item 3: Fleet vehicle kilometres according to vehicle age.....	94
3.4.1.3	Item 4: Annual vehicle kilometres according to type of road.....	95
3.4.2	CARE database	95
3.4.2.1	Item 7: Fatal accidents	95
3.4.3	German Mobility Study.....	97
3.4.4	TREMOVE database.....	98
3.4.4.1	Item 1: Vehicle kilometres (annual average).....	99
3.4.4.2	Item 2: Vehicle age according to total vehicle kilometres.....	99
3.5	Detailed evaluation and results	102
3.5.1	Data availability	102
3.5.2	Data analysis.....	102
3.5.2.1	Comparison Eurostat – FLEETS data: annual vehicle kilometres.....	103

3.5.2.2	Comparison of German Mobility Study (2008) – FLEETS data: annual vehicle kilometres	104
3.5.3	Summary	105
4	Effects of policy measures.....	106
5	Conclusions and recommendations	107
6	References.....	111

Annex

Annex 1: List of electronically available documents: literature and database

Annex 2: Detailed overview of contents and coverage of data sets from Eurostat´s Transport Database

Annex 3: List of national experts approached in the study

Annex 4: Questionnaires I and II

Annex 5: Estimation of the minimum import / export numbers of used vehicles

Tables

Table 1:	Exemption thresholds in € and share of traders exempted from reporting for intra-EU trade (Eurostat, 2009).....	5
Table 2:	Main parameters for used vehicle trade selected from intra-EU 27 trade data	6
Table 3:	Types of used passenger cars selected.....	6
Table 4:	Types of used light commercial vehicles selected	6
Table 5:	Statistical thresholds for extra-EU 27 trade (Eurostat, 2009).....	9
Table 6:	Selection from extra EU-27 trade.....	10
Table 7:	ELV scrapped (M1 + N1) as reported by the Member States according the ELV Directive [Source: Eurostat].....	12
Table 8:	Export of cars (M1) from Belgium for the years 2006 to 2009	15
Table 9:	Registration of imported used passenger cars in the Czech Republic in 2009 [Source: SDA-CIA]	17
Table 10:	Numbers of used vehicles imported to Denmark and vehicle de-registrations (receiving a refund of registration tax) in Denmark [Source: Danish Customs, SKAT]	20
Table 11:	Information on vehicles previously registered in Germany and re-registered abroad [Source: KBA]	21
Table 12:	Estonian used car imports by age in 2009 [Source: ARK]	23
Table 13:	Estonian used car imports by fuel type in 2009 [Source: ARK].....	23
Table 14:	Import of used vehicles (M1&N1) to Ireland by country of origin	24
Table 15:	Import of used vehicles (M1+N1) to Ireland by age class	24
Table 16:	Import of used vehicles (M1&N1) to Ireland by vehicle kilometres	25
Table 17:	Import of used vehicles (M1&N1) to Ireland by fuel type and motor size.....	25
Table 18:	Exported used vehicles in Spain [Source: DGT]	25
Table 19:	Exported used vehicles from Italy for the year 2008 [Source: Italian Ministry of Transport]	27
Table 20:	Hungarian used vehicle imports from 2005 to 2008 [Source: KTI].....	28
Table 21:	Dutch import and export of used vehicles for the years 2005 to 2009 [Source: RDW]	30
Table 22:	Polish used car imports (M1) by age for the year 2008 [Source: PL Int. Min.]	30
Table 23:	Imported used vehicles to Finland for the years 2003 to 2009, differentiated by year of first registration (age) [Source: Autotuojat ry]	34
Table 24:	Used vehicle ex- and import from / to Sweden in 2009 [Source: SE Transport Agency].....	36
Table 25:	Global balance of the whereabouts of vehicles for the years 2006 to 2008.....	38
Table 26:	Consolidated results of the estimations for the relevance of imports and exports (M1 & N1) to the composition of the national fleets for the year 2008.	42

Table 27:	Polish extra-EU 27 exports according to different sources	45
Table 28:	Polish extra-EU 27 imports according to different sources	45
Table 29:	Global balance of the Polish fleet evolution	45
Table 30:	Change in the Polish fleet for different car ages	46
Table 31:	Calculation of “scrappage” from the Polish fleet for different car ages, taking into account imports and exports (net cross-border trade).....	47
Table 32:	Extra-EU 27 exports and imports for Slovakia [Comext].....	49
Table 33:	Global balance of the Slovak fleet evolution	49
Table 34:	Detailed balance for the Slovak fleet evolution in 2008 according to age.....	50
Table 35:	Czech used car exports and imports [SDA-CIA]	52
Table 36:	New registrations in the Czech Republic according to different sources	52
Table 37:	Global balance of the Czech fleet evolution.....	52
Table 38:	Calculation of “scrappage” from the Czech fleet for different car ages	53
Table 39:	Share of estimated scrappage compared to the Czech fleet	54
Table 40:	Sum of passenger cars (M1), 2004-2009 by age group.....	56
Table 41:	Scrappage rates for EU (M1), 2005-2009.....	57
Table 42:	Calculation of exports in the case of Germany (M1)	58
Table 43:	Sum of light duty vehicles (N1), 2004-2009 by age group.	63
Table 44:	Scrappage rates for EU 2005-2009 (N1)	64
Table 45:	Calculation of exports for Germany (N1).....	65
Table 46:	Sum of vehicles (M1+N1), 2004-2009 by age group.....	68
Table 47:	Scrappage rates for EU (M1+N1), 2005-2009.	69
Table 48:	Calculation of exports in the case of Germany (M1+N1)	70
Table 49:	Scrappage rates for EU (M1+N1), 2005-2009.	74
Table 50:	Strengths and weaknesses of the four economic indicators used for correlation	81
Table 51:	Descriptive statistics Item 1 (Questionnaire).....	87
Table 52:	Collected data Item 1 (Questionnaire)	87
Table 53:	Descriptive statistic Item 2 (Questionnaire).....	88
Table 54:	Collected data Item 2 (Questionnaire)	88
Table 55:	Descriptive statistic Item 3 (Questionnaire).....	89
Table 56:	Descriptive statistic Item 4 (Questionnaire).....	89
Table 57:	Collected data Item 4 (Questionnaire Hungary).....	90
Table 58:	Collected data Item 4 (Finland)	90
Table 59:	Descriptive statistic Item 5 (Questionnaire).....	90
Table 60:	Collected data Item 5 (Questionnaire)	91
Table 61:	Descriptive statistic Item 6 (Questionnaire).....	91
Table 62:	Collected data Item 6 (Questionnaire)	91
Table 63:	Descriptive statistic Item 7 (Questionnaire).....	91
Table 64:	Collected data Item 7 (Questionnaire)	92

Table 65: Total vehicle kilometres differentiated by age (Eurostat Transport).....	93
Table 66: Registered vehicles differentiated by age (Eurostat Transport).....	93
Table 67: Annual vehicle kilometres differentiated by age (Calculated from Eurostat).....	94
Table 68: Total vehicle kilometres differentiated by age (Eurostat Transport).....	94
Table 69: Total vehicle kilometres (relative) differentiated by age (Eurostat)	94
Table 70: Annual vehicle kilometres differentiated by type of road (Eurostat Transport).....	95
Table 71: In-vehicle fatalities (CARE database)	96
Table 72: Annual vehicle kilometres and vehicle occupancy (MiD, 2010)	97
Table 73: M1 vehicle age according to total vehicle kilometres (TREMOT/FLEETS/TREMOVE).....	100
Table 74: N1 vehicle age according to total vehicle kilometres (TREMOT/FLEETS/TREMOVE).....	101
Table 75: Comparison annual vehicle kilometres differentiated by vehicle age Eurostat vs. FLEETS/TREMOVE v3.3.2	103
Table 76: Comparison annual vehicle kilometres differentiated by vehicle age, German Mobility Study (MiD) vs. TREMOD/FLEETS/TREMOVE v3.3.2.....	104

Figures

Figure 1: Export and import of used passenger cars for intra-EU 27 trade for the reference year 2008.....	7
Figure 2: Total numbers of extra-EU 27 export and import of used passenger cars for the reference year 2008.....	10
Figure 3: Average value of exported/imported used passenger cars to/from third countries for the reference year 2008	11
Figure 4: Age distribution of the Czech used car imports (2007 to 2009) [Source: SDA-CIA].....	19
Figure 5: Main destinations of German used car exports [Source: KBA]	22
Figure 6: Main destinations of German used car exports [Source: BMU, 2010]	22
Figure 7: Age structure of the Hungarian used car imports [Source: KTI].....	29
Figure 8: Used car imports to Hungary by age and fuel type for 2008 [Source: KTI].....	29
Figure 9: Age structure of the Polish intra-EU 27 used car imports for 2007 to 2009 [Source: PL Int. Min.].....	31
Figure 10: Fuel type and motor size of the Polish used vehicle imports (M1) [Source: PL Int. Min.].....	32
Figure 11: Used car imports to the Slovak Republic for the years 2005 to 2009, differentiated by age [SK Int. Min.].....	33
Figure 12: Age structure of Finnish used car imports (M1) [Source: Autotuoajat ry].....	34
Figure 13: Global balance of the EU 27-fleet for the year 2008	39

Figure 14: Average scrappage rates for EU, (M1) 2005-2009.	57
Figure 15: Net passenger cars imports (M1), average 2004 - 2009.....	59
Figure 16: Net exporters of passenger cars (M1), average number of vehicles 2004 - 2009.	60
Figure 17: Net importers of passenger cars (M1), average number of vehicles 2004 - 2009	60
Figure 18: Large net importers of passenger cars (M1), average number of vehicles 2004 - 2009	61
Figure 19: Share of new car registrations of total car fleet (M1), 2009	62
Figure 20: Average scrappage rates for EU 2005-2009 (N1).....	64
Figure 21: Net imports of light duty vehicles (N1), average 2004 - 2009.	66
Figure 22: Net exporters of light duty vehicles (N1), average number of vehicles 2004 - 2009.	67
Figure 23: Net importers of light duty vehicles (N1), average number of vehicles 2004 - 2009	67
Figure 24: Average scrappage rates for EU, (M1+N1) 2005-2009.....	70
Figure 25: Net vehicle imports (M1+N1), average 2004 - 2009	71
Figure 26: Net exporters of vehicles (M1+N1), average number of vehicles 2004 - 2009	72
Figure 27: Net importers of vehicles (M1+N1), average number of vehicles 2004 - 2009	72
Figure 28: Large net importers of vehicles (M1+N1), average number of vehicles 2004 - 2009.	73
Figure 29: Average scrappage rates for EU, (M1+N1) 2005-2009.....	75
Figure 30: Net vehicle imports (M1+N1), average 2004 - 2009.	76
Figure 31: Net exporters of vehicles (M1+N1), average number of vehicles 2004 - 2009.	77
Figure 32: Net importers of vehicles (M1+N1), average number of vehicles 2004 - 2009	77
Figure 33: Large net importers of vehicles (M1+N1), average number of vehicles 2004 - 2009	78
Figure 34: Net export of used vehicles (M1+N1) according to total final consumption of households.....	82
Figure 35: Net export of used vehicles (M1+N1) according to GDP per capita.....	82
Figure 36: Net export of used vehicles (M1+N1) according to final consumption of households for transport	83
Figure 37: Net export of used vehicles (M1+N1) according to disposable income	83

Abbreviations

ACEA	European Automobile Manufacturers' Association
ANFAC	Spanish Automobile and Lorries Manufacturers' Association
Comext	Eurostat external trade statistics
DG	Directorate-General
DG TREN	Directorate-General for Transport and Energy (existing until 2010)
EC	European Commission
ELV	End-of-life vehicles
EPA	Environmental Protection Agency
ESTAT	Eurostat
GDP	Gross domestic product
Int. Min.	Interior Ministry
KBA	Kraftfahrtbundesamt (German Federal Motor Transport Authority)
LCV	Light Commercial Vehicles
M1	Passenger Cars (PC)
MS	Member States of the EU
N1	Light Commercial Vehicles (LCV)
OECD	Organisation for Economic Co-operation and Development
PC	Passenger Cars
SDA-CIA	Czech Car Importers' Association
SIMI	Society of the Irish Motor Industry
SMMT	Society of Motor Manufacturers and Traders UK
TREMOD	Transport Emission Model

Country Codes

BE	Belgium	FR	France	AT	Austria
BG	Bulgaria	IT	Italy	PL	Poland
CZ	Czech Republic	CY	Cyprus	PT	Portugal
DK	Denmark	LV	Latvia	RO	Romania
DE	Germany	LT	Lithuania	SI	Slovenia
EE	Estonia	LU	Luxembourg	SK	Slovakia
IE	Ireland	HU	Hungary	FI	Finland
EL or GR	Greece	MT	Malta	SE	Sweden
ES	Spain	NL	Netherlands	UK	United Kingdom

1 Introduction

The Contractor's consortium is led by **Öko-Institut e.V.** (Germany) in collaboration with **TML** (Belgium) and **COWI** (Denmark).

The reduction of greenhouse gas emissions and other emissions from the transport sector is a highly relevant issue at European level. In order to establish a coherent and effective European policy in this field it is vital to have sound information on the composition of the vehicle fleet in Europe. In the passenger car sector in particular, knowledge concerning the cross border trade of second-hand cars and usage patterns according to change in ownership of cars is needed.

As European statistical information falls short on the issue, one focus of the analysis shall be on collecting information and data in the car sector.

Based on a public tender the Contractor was commissioned to provide a **study on the European second-hand car market**.

The more detailed aim of the project is to contribute to a better understanding and subsequently a better modelling of the fleet composition in EU Member States. This shall improve the prediction of fleet emissions and help the European Commission (DG Climate Action) to deduce suitable policy measures for the reduction of these emissions in view of local air pollution and global climate change.

The **scope** of the study is limited to passenger cars (M1) and light utility vehicles (N1) and the time dimension from 2005 to 2010.

This final report presents all the findings and data of the project.

2 Cross-border trade of used vehicles

The modelling of fleet emissions is essentially based on information or assumptions concerning the technology of the vehicles in the fleet. In general, vehicle technology correlates with its age (e.g. emission class). Alongside the age structure of vehicles inside the fleet, the fleet age distribution is influenced by the cars entering the fleet (new registrations and used vehicle imports) and exiting it (used vehicle exports and end-of-life vehicles).

Current modelling approaches, like e.g. REMOVE (REMOVE, 2007), have not yet incorporated information on used vehicles entering the fleet but consider all incoming vehicles as new vehicles (with the corresponding lower emission class). This can lead to considerable distortions in countries where used vehicle import accounts for a relevant portion of overall entries to the fleet. The aim of the present analysis of the cross-border trade of used vehicles was hence to gather and evaluate information concerning:

- numbers of used vehicles entering / exiting the national fleets
- age distribution of the traded vehicles
- fuel type and motor size of the traded vehicles.

From the latter two points the emissions of the vehicles can be derived.

A special focus of the study lay on the analysis of the cross-border trade between EU 27 countries as reliable data for the internal European market in this case are especially scarce because of free trade between Member States.

A preliminary literature review revealed that few data on European cross-border trade is available and where information is available it is rather scattered and “hidden” at national institutions (e.g. data for Germany in the national traffic authority’s Annual Report of 2007 (KBA, 2008)). All documents gathered and analysed in this context are listed in Annex 1 and available electronically via http://www.oeko.de/publications/reports_studies/dok/659.php.

Following this the present study focused on three main activities the outcome of which is presented in the following chapters.

- International sources (Chapter 2.1)

On the European level data on cross-border trade from European statistics (Eurostat) and from associations active in the automotive field were examined. Moreover, reports from projects which had already been carried out with a European perspective (FLEETS, 2008; REMOVE, 2007) were searched for further data.

- National sources (Chapter 2.2)

In order to get access to the data on cross-border trade available on the national level a comprehensive survey was issued to various national institutions and organisations. Further communication with national experts was carried out to consolidate the resulting data and to broaden the database.

➤ Detailed evaluation and results (Chapter 2.3)

The last step included a detailed analysis of the data gained from the two previous steps. This analysis concentrated on their effect on the evolution of the fleet and possible modelling approaches.

As a last step the attempt was made to correlate economic drivers (e.g. GDP, income per household or private consumption) with the import-/export- patterns of the different Member States in order to identify indicators which allow the level of import / export of used vehicles to be forecasted (Chapter 2.3.5).

2.1 International sources

Before investigating specific national sources on the cross-border trade of used vehicles in the European Union (see Chapter 2.2) international data sources on the subject were identified. The relevant international sources are described in the following chapters concerning their contents, coverage, and their contribution to the target of the present study. The full data sets are electronically available as mentioned in Annex 1.

2.1.1 Eurostat's Transport Database

From Eurostat's Transport Data Base the data tables relevant for this study were downloaded for the period 2000 (where available) up to the most recent reporting year (in general 2007 with some exceptions) and analysed. The download was performed the 7th April 2010. The various files are electronically available as mentioned in Annex 1. Concerning the definitions of the titles and categories we refer to "*Eurostat, Illustrated Glossary of Transport Statistics 4th Edition 14 07 2009*" (Eurostat, 2009b) which is also available electronically.

- i. ESTAT_Passenger cars, by age_100407.xls
- ii. ESTAT_Passenger cars, by motor energy_100407.xls
- iii. ESTAT_Passenger cars by unloaded weight_100407.xls
- iv. ESTAT_New registrations of passenger cars by type of motor energy and engine size_100407.xls
- v. ESTAT_New registrations of passenger cars by unloaded weight_100407.xls
- vi. ESTAT_Lorries, by age (number)_100408.xls
- vii. ESTAT_Lorries, by load capacity (number)_100907.xls
- viii. ESTAT_Lorries, by type of motor energy and load capacity_100408.xls
- ix. ESTAT_New registrations of lorries, by load capacity (number)_100408.xls
- x. ESTAT_New registrations of lorries, by motor energy and load capacity (number)_100408.xls
- xi. ESTAT_Volume of passenger transport_100407.xls
- xii. ESTAT_Modal split of passenger transport_100407.xls
- xiii. ESTAT_Motor vehicle movements on national territory, by vehicles registration_100704.xls
- xiv. ESTAT_Passenger road transport on national territory, by type of vehicles_100407.xls

xv. ESTAT_Road traffic on national territory by type of vehicle and road_100408.xls

The data from Eurostat's Transport Database only refer to the national fleet composition (i-iii for M1 and vi-viii for N1), the new registrations by country (iv-v for M1 and ix-x for N1) as well as vehicle movement inside each country (xi-xv). The latter might be used for the description of usage patterns but there is no direct connection to the purpose of describing cross-border vehicle trade in any of the data sets. However, when calculating balances of the national fleets in order to determine exit rates or scrappage rates (see Chapter 0) the data on the national fleet composition by age (i) and on new registrations (iv and ix) were partially used to complete information published by ACEA (see Chapter 2.1.4). In all cases it needs to be kept in mind that according to Eurostat light lorries are grouped in one class up to a load capacity of five tons.

A detailed compilation of the contents and coverage of each data set can be found in Annex 2.

2.1.2 Eurostat's External Trade Statistics (Comext)

External trade statistics as produced by Eurostat (Comext) measure the value (in €) and the quantity of goods traded between the Member States of the European Union (known as intra-EU 27 trade or Intrastat) as well as the value and quantity of goods traded by the Member States of the EU with third countries (known as extra-EU 27 trade or Extrastat). They are the official harmonised source of information about imports, exports and the trade balance of the EU and its Member States as well as of the Euro-area.

2.1.2.1 Intra-EU 27 trade according to Comext

Statistics relating to the trading of goods between Member States (intra-EU) are based on the Regulation (EC) No 638/2004 of the European Parliament and the Council, and on the Commission Regulation (EC) No 1982/2004 and the amending Commission Regulation (EC) 1915/2005. Data are collected directly from trade operators as a consequence of the abolishment of customs control at the borders between the Member States (MS). The reporting burden is reduced as far as possible: private individuals and small traders are exempted from any statistical obligations. Concerning enterprises each MS defines reporting thresholds that completely exempt enterprises from providing statistical information or limit the information to be provided.

As an example the table below displays the exemption thresholds applied in the MS. More information on the applied reporting methodologies and discrepancies between the countries are explained in the Quality Report (Eurostat, 2009a) available electronically as mentioned in Annex 1.

Table 1: Exemption thresholds in € and share of traders exempted from reporting for intra-EU trade (Eurostat, 2009)

MEMBER STATES	Exemption threshold in €		Share of traders exempted from reporting		
	Arrivals	Dispatches	Arrivals	Dispatches	Total
Belgium	400 000	1 000 000	92%	89%	92%
Bulgaria	76 694	51 129	:	:	:
Czech Republic	65 000	130 000	67%	74%	65%
Denmark	242 000	630 000	78%	78%	80%
Germany	300 000	300 000	90%	79%	87%
Estonia	127 823	127 823	64%	66%	63%
Ireland	191 000	635 000	97%	95%	97%
Greece	55 000	55 000	39%	27%	36%
Spain	200 000	200 000	83%	74%	80%
France	150 000	150 000	50%	58%	:
Italy	180 000	250 000	84%	72%	:
Cyprus	52 147	52 147	45%	56%	49%
Latvia	69 721	115 253	66%	69%	64%
Lithuania	72 405	101 367	55%	65%	55%
Luxembourg	150 000	150 000	81%	75%	80%
Hungary	240 000	400 000	80%	84%	81%
Malta	700	700	:	:	:
Netherlands	400 000	400 000	85%	80%	91%
Austria	300 000	300 000	86%	77%	84%
Poland	127 166	203 626	50%	56%	:
Portugal	70 000	110 000	86%	91%	84%
Romania	85 000	250 000	67%	71%	69%
Slovenia	85 000	200 000	74%	73%	73%
Slovakia	132 749	265 498	78%	80%	78%
Finland	100 000	200 000	72%	71%	71%
Sweden	238 000	484 000	85%	85%	83%
United Kingdom	385 000	385 000	82%	83%	82%

In order to analyse the trade of used vehicles between the MS the reporters and categories detailed in Table 2 were selected from the intra-EU 27 data.

Table 2: Main parameters for used vehicle trade selected from intra-EU 27 trade data

Categories	Selection	N° of categories
Trade direction	Import, export	2
Origin / destination	27 MS + aggregation EU 27	28
Destination / origin	27 MS + aggregation EU 27	28
Used Passenger Cars	By type and size of engine	7
Used light commercial vehicles	By type and size of engine (≤ 5 tons)	4
Reference years	2000 - 2008	8
By Unit	Number of cars; value of trade	2
	Total cells:	275 968

Within the categories passenger cars and light commercial vehicles (LCV) the sub-categories “type of engine” and “size of engine” were chosen (see Table 3 and Table 4).

Table 3: Types of used passenger cars selected

Used motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars (excl. vehicles for the transport on snow and other specially designed vehicles under subheading 8703.10)
87032190, WITH SPARK-IGNITION INTERNAL COMBUSTION RECIPROCATING PISTON ENGINE OF A CYLINDER CAPACITY ≤ 1.000 CM ³
87032290 - WITH SPARK-IGNITION INTERNAL COMBUSTION RECIPROCATING PISTON ENGINE OF A CYLINDER CAPACITY > 1.000 CM ³ BUT ≤ 1.500 CM ³
87032390 - WITH SPARK-IGNITION INTERNAL COMBUSTION RECIPROCATING PISTON ENGINE OF A CYLINDER CAPACITY > 1.500 CM ³ BUT ≤ 3.000 CM ³
87032490 - WITH SPARK-IGNITION INTERNAL COMBUSTION RECIPROCATING PISTON ENGINE OF A CYLINDER CAPACITY > 3.000 CM ³ ,
87033190 - WITH COMPRESSION-IGNITION INTERNAL COMBUSTION PISTON ENGINE "DIESEL OR SEMI-DIESEL ENGINE" OF A CYLINDER CAPACITY ≤ 1 .
87033290 - WITH COMPRESSION-IGNITION INTERNAL COMBUSTION PISTON ENGINE "DIESEL OR SEMI-DIESEL ENGINE" OF A CYLINDER CAPACITY > 1.5
87033390 - WITH COMPRESSION-IGNITION INTERNAL COMBUSTION PISTON ENGINE "DIESEL OR SEMI-DIESEL ENGINE" OF A CYLINDER CAPACITY > 2.5

Table 4: Types of used light commercial vehicles selected

Used MOTOR VEHICLES FOR THE TRANSPORT OF GOODS (EXCL. DUMPERS FOR OFF-HIGHWAY USE OF SUBHEADING 8704.10, SPECIAL PURPOSE MOTOR VEHICLES OF HEADING 8705 AND SPECIAL MOTOR VEHICLES FOR THE TRANSPORT OF HIGHLY RADIOACTIVE MATERIALS)
87042139 - WITH COMPRESSION-IGNITION INTERNAL COMBUSTION PISTON ENGINE "DIESEL OR SEMI-DIESEL ENGINE" OF A GROSS VEHICLE WEIGHT ≤ 5 T, OF A CYLINDER CAPACITY > 2.500 CM ³ ,
87042199 - WITH COMPRESSION-IGNITION INTERNAL COMBUSTION PISTON ENGINE "DIESEL OR SEMI-DIESEL ENGINE" OF A GROSS VEHICLE WEIGHT ≤ 5 T, OF A CYLINDER CAPACITY ≤ 2.500 CM ³
87043139 - WITH SPARK-IGNITION INTERNAL COMBUSTION PISTON ENGINE, OF A GROSS VEHICLE WEIGHT ≤ 5 T, OF A CYLINDER CAPACITY > 2.800 CM ³ ,
87043199 - WITH SPARK-IGNITION INTERNAL COMBUSTION PISTON ENGINE, OF A GROSS VEHICLE WEIGHT ≤ 5 T, OF A CYLINDER CAPACITY ≤ 2.800 CM ³

The following figure displays the total intra-EU 27 export and import numbers for each Member State (reporter) and the aggregate of the total EU 27 import and export. In principal the origin and destination of the import / export, the different car types and other reference years can be displayed as well but it would overload the figure.

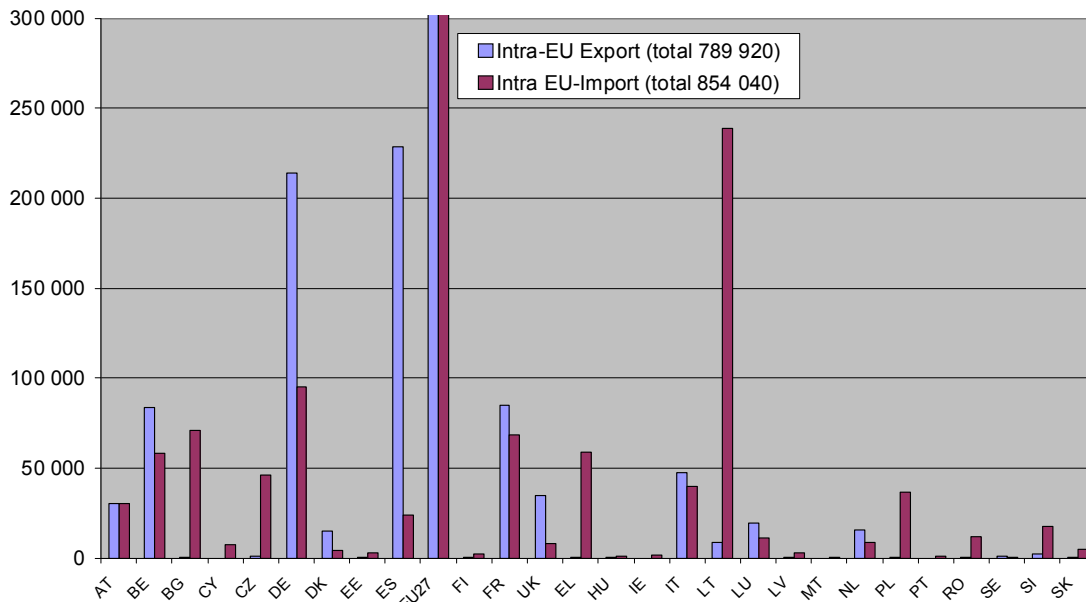


Figure 1: Export and import of used passenger cars for intra-EU 27 trade for the reference year 2008

To evaluate the reported data for intra-EU 27 trade we compared these numbers per country with the export data from Germany as reported by the German Kraftfahrtbundesamt (KBA). The figures reported by KBA are displayed in Table 11 below.

As reported by KBA the data exchange between the countries is still improving (as can be seen by the large jump in numbers between 2006 and 2007 for instance for the Czech Republic or Bulgaria). Hence the KBA data might even underestimate the total German exports. Nevertheless for the year 2008 the national source KBA reports six times higher export than reported by intra-EU 27 Eurostat Statistics for used passenger cars. Even having in mind that uncertainties might arise from the varying definitions of PC and LCV used in different MS this clearly demonstrates that the reporting methodologies for intra-EU 27 generate massive underestimations.

As another means to evaluate the reliability of the Comext intra-EU 27 data a cross-check of the import/export sums was carried out based on the fact that the intra-EU 27 exports / imports of one MS need to equal the imports / exports of all other MS into that country. The other MS need to “mirror” the trade behaviour of each MS. This procedure uncovered remarkable deviations as well. It can be assumed that these are due to the different reporting thresholds applied by each country in combination with varying economic operators who are obliged (or not) to report (“micro-trader”).

As a conclusion it is recommended that **the Comext figures for intra-EU 27 trade** should not be considered a reliable source for the cross-border trade of used cars and the related effects on the national fleets because massive underestimations of the trade are evident. As mentioned above, the reasons for this underestimation are most likely caused by varying

reporting thresholds for the economic operators involved in the cross border trade. This is especially true as obviously a majority of the transports is conducted by small or medium companies with a rather low volume of sales. The following example might demonstrate this effect. Based on the assumption that the average value of an imported car is € 3 000 , the economic operator must import at least 50 units of used cars to exceed a reporting threshold of, for example, € 150 000 (prescribed by, for instance, France or Luxembourg, see Table 1). Despite their low quality all downloads from Comext for intra-EU 27 trade of passenger cars and LCV are available electronically as addressed in Annex 1.

In a few cases where no better data were available these numbers served as minimum values for the estimation of import / export volumes (see Chapter 2.3.2).

2.1.2.2 Extra-EU 27 trade according to Comext

The statistics on the trade with third countries (extra-EU 27) are based on the Council Regulation (EC) 1172/95, the Commission Regulation (EC) 1917/2000 and its amending Commission Regulations EC 1669/2001, 179/2005 and 1949/2005. Extra-EU 27 trade statistics data are compiled from the customs declarations. Trade operators fulfilling their reporting obligations to the customs authorities in a Member State (MS) at the same time provide data used for the trade statistics.

In principle extra-EU 27 trade statistics cover all imports and exports declared by the MS. However, it is allowed to exclude transactions whose value and net mass are lower than statistical thresholds. These thresholds are set at a maximum of € 1 000 or 1000 kg. The table below shows the exemption thresholds as applied in the Member States. More information on the applied reporting methodologies and discrepancies between the countries is given in the Quality Report (Eurostat, 2009a) available electronically as stated in Annex 1.

Table 5: Statistical thresholds for extra-EU 27 trade (Eurostat, 2009)

MEMBER STATES	Extrastat statistical threshold
Belgium	€ 800 or 1000 kg
Bulgaria	No threshold
Czech Republic	€1000 or 1000 kg
Denmark	€ 1 008 or 1000 kg, except 403 € and 1000 kg for exports to Greenland and the Faeroe Islands
Germany	€ 1 000 or 1000 kg
Estonia	No threshold
Ireland	No threshold
Greece	No threshold
Spain	€ 1 000 or 1000 kg
France	€ 1 000 or 1000 kg
Italy	€ 700 (chapters 1-14), € 1 000 (chapters 15-97)
Cyprus	No threshold
Latvia	No threshold
Lithuania	€ 1 000 in value and 1000 kg
Luxembourg	No threshold
Hungary	No threshold
Malta	No threshold
Netherlands	No threshold
Austria	€ 1 000
Poland	No threshold
Portugal	No threshold
Romania	No threshold
Slovenia	€ 1 000
Slovakia	€ 1 000 or 1000 kg
Finland	€ 1 000
Sweden	No threshold
United Kingdom	€ 1 000 or 1000 kg

Source: 2008 Quality Questionnaire.

Table 6 displays the reporters and categories of extra-EU 27 Comext data selected for the analysis of cross-border trade of used vehicles between EU MS and third countries.

Table 6: Selection from extra EU-27 trade

Categories	Selection	N° of categories
Trade Direction	Import; Export	2
Origin / Destination	27 MS + aggregation EU27	28
Destination / Origin	Extra-EU	1
Used Passenger Cars	By type and size of engine	7
Used light commercial vehicle	By type and size of engine (\leq 5 tons)	4
Reference Years	2000 – 2008	8
By Unit	Number of cars; value of trade	2
	Total cells:	9 856

The seven types of passenger cars and the four types of light commercial vehicles considered are the same as shown earlier in Table 3 and Table 4.

As an example the following figure displays the total export and total import of the EU 27 MS as reported for passenger cars for the year 2008. Additional data are available for the years 2000 to 2007 and for LCV as well as a break down by the eleven types of vehicles.

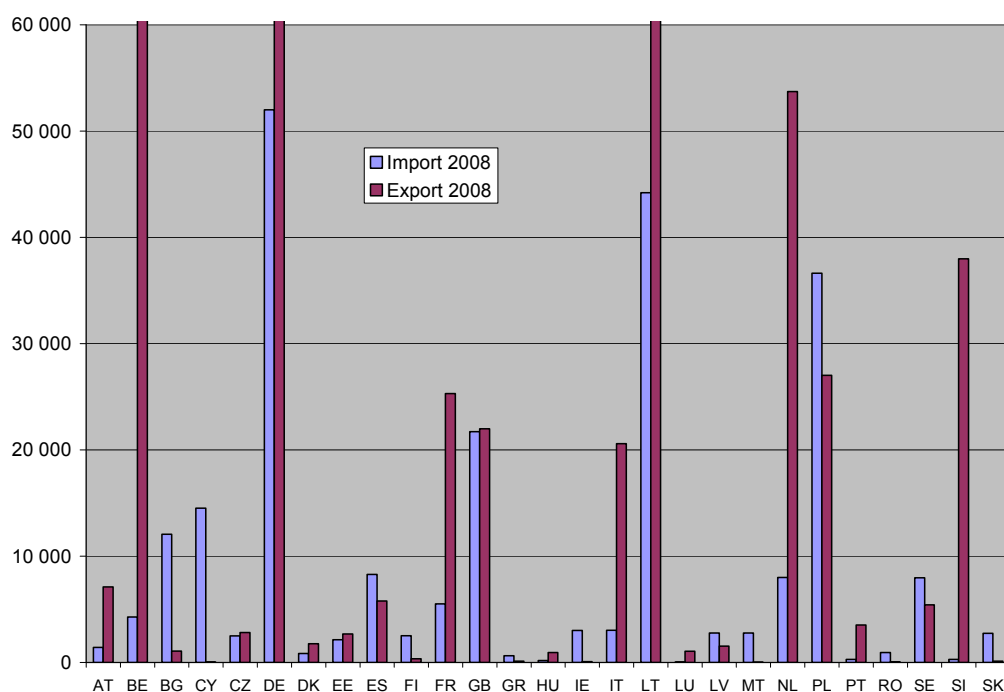


Figure 2: Total numbers of extra-EU 27 export and import of used passenger cars for the reference year 2008 (Export BE: 189 671; DE: 243 091; LT 238 851)

The data on the numbers of extra-EU 27 export and import are deemed reliable as reporting thresholds are low.

Concerning the purpose of this study, the impact of extra-EU27 export / import was evaluated against the background of the total fleet in each country. With respect to the German figures shown in Table 11, the total amount of extra-EU 27 trade seems to have a smaller effect on the composition of the national fleet than the intra-EU 27 trade. Its relevance for the fleets of other countries is discussed in Chapter 2.3.2.

Figure 3 shows the average value of the imported and exported passenger cars to third countries. Data for LCV and a more differentiated breakdown by year and the eleven types of vehicles are available electronically as addressed in Annex 1.

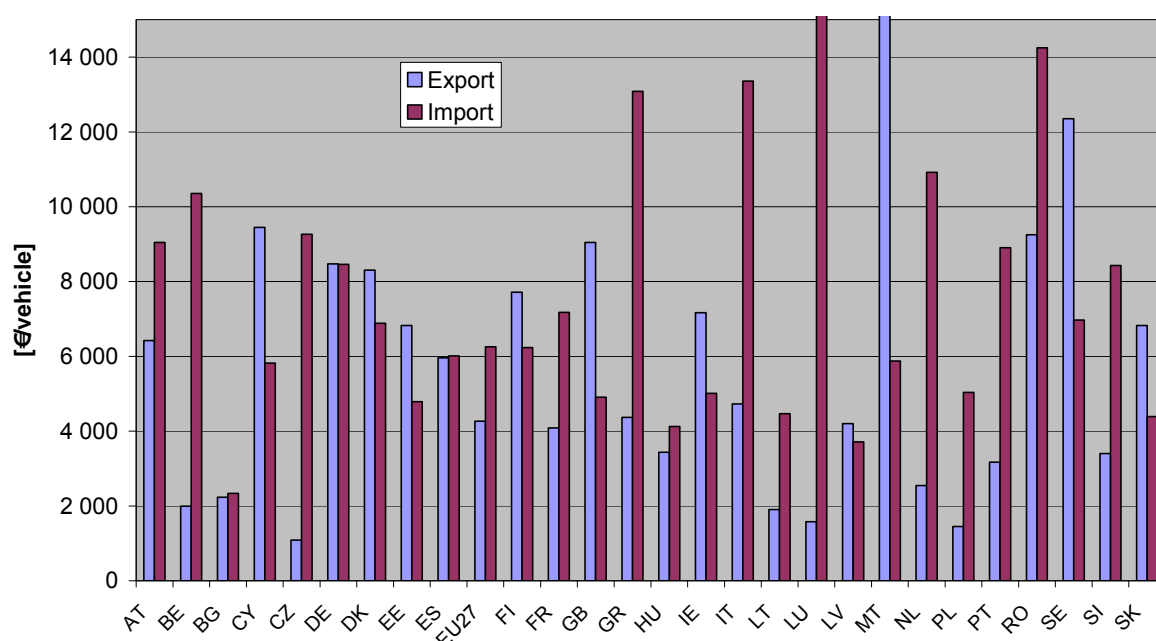


Figure 3: Average value of exported/imported used passenger cars to/from third countries for the reference year 2008 (LU Export: € 37 313; MT Import: € 18 667)

These data were calculated based on the total trade volume and the number of exported/imported used vehicles. Their accuracy is difficult to estimate. However, the general tendency seems plausible. Combining the type of vehicle with its selling price might allow an estimate concerning its age. However, this requires a very detailed evaluation of the available data. As the focus of the present study lies on the analysis of the cross-border trade within the EU, this particular evaluation was excluded.

2.1.2.3 Conclusion: Use of Comext data in the present study

Regarding the use of the data described in Chapters 2.1.2.1 and 2.1.2.2 it is important to keep in mind that the extra-EU 27 data are considered reliable as the reporting to Eurostat is performed by the customs' authorities and the reporting thresholds of car traders at customs are low. Contrarily the intra-EU 27 figures are assessed as weak since the reporting to Eurostat is performed directly by the commercial operators and the reporting thresholds are high.

The Comext data on cross-border trade of used vehicles are available electronically

reviewing the following files:

- Comext_extra-EU27_passengercars_00-08.xls
- Comext_extra-EU27_lcv_00-08.xls
- Comext_intra-EU27_passengercars_00-08.xls
- Comext_intra-EU27_lcv_00-08.xls

Concerning light commercial vehicles it should be kept in mind that according to Eurostat these are grouped into one class up to a load capacity of five tons.

The presumably accurate data on extra-EU 27 trade were analysed in detail and are presented in a well-elaborated manner in the files. Due to the limited quality of the intra-EU 27 trade data these were not comprehensively analysed and only used in a few exceptional cases as minimum values for European cross-border trade.

2.1.3 Eurostat's Waste Statistics (EDC-Waste) on End-of-Life Vehicles

Since 2006 the ELV Directive 2000/53/EC obliges the Member States (MS) to monitor the collection and treatment of M1- and N1- end-of-life Vehicles (ELV). Annual reporting is now available for the three reporting years 2006, 2007 and 2008.

Monitoring includes the recycling and recovery quota without differentiation according to type of car (type and size of engine), age or vehicle kilometres. Table 7 below shows the absolute numbers of vehicles reportedly scrapped according to the ELV Directive.

Table 7: ELV scrapped (M1 + N1) as reported by the Member States according the ELV Directive [Source: Eurostat]

	2006	2007	2008
BE	131 043	127 949	141 521
BG	45 127	23 433	38 600
CZ	56 582	72 941	147 259
DK	102 202	99 391	101 042
DE	499 756	456 436	417 534
EE	11 035	12 664	13 843
IE	-	112 243	127 612
EL	29 689	47 414	55 201
ES	954 715	881 164	748 071
FR	930 000	946 497	1 109 876
IT	1 379 000	1 692 136	1 203 184
CY	1 032	2 136	14 273
LV	6 288	11 882	10 968
LT	13 877	15 906	19 534
LU	4 864	3 536	2 865

	2006	2007	2008
HU	20 976	43 433	37 196
MT	-	-	-
NL	192 224	166 004	152 175
AT	87 277	62 042	63 975
PL	150 987	171 258	189 871
PT	25 641	90 509	107 746
RO	21 234	36 363	51 577
SI	-	8 409	6 780
SK	15 069	28 487	39 769
FI	14 945	15 792	103 000
SE	283 450	228 646	150 197
UK	995 569	1 138 496	1 210 294
EU 27	5 972 591 ¹⁾	6 495 167 ²⁾	6 263 963 ²⁾

¹⁾ excluding IE, MT, SI; ²⁾ excluding MT

For the reporting year 2008 a more advanced guidance document was issued by Eurostat, asking the countries for more evidence on the whereabouts of the ELVs and export / import of used cars. The evaluation of the national reports is currently carried out by Eurostat. One essential observation is that several countries in their reporting refer to the Certificates of Destruction (CoDs) only being aware that more ELVs are de-polluted and dismantled within the country without CoD and are therefore not reported.

Within this study the Eurostat data on ELV were used when performing balances of the national fleets (see Chapter 2.3.3) and for the global EU 27-fleet balance (see Chapter 2.3.1).

2.1.4 Data from car associations as ACEA

The European Automobile Manufacturers' Association (ACEA) monthly publishes data on new registrations for passenger cars and light commercial vehicles up to 3.5 t (excluding mini-buses up to 3.5 t). These data are available electronically as addressed in Annex 1.

- 20090407_2000_By_Country_Western_Europe.xls
- 20090407_2001_By_Country_Western_Europe.xls
- 20090407_2002_By_Country_Western_Europe.xls
- 20090407_2003_By_Country_Enlarged_Europe.xls
- 20090407_2004_By_Country_Enlarged_Europe.xls
- 20090407_2005_By_Country_Enlarged_Europe.xls
- 20090407_2006_By_Country_Enlarged_Europe.xls
- 20090407_2007_By_Country_Enlarged_Europe.xls
- 20091210_02_2008_vo_By_Country_Enlarged_Europe.xls
- 20100309_02_2009_vo_By_Country_Enlarged_Europe.xls

- 20100309_01_2010_vo_By_Country_Enlarged_Europe.xls

Annually ACEA publishes comprehensive reports on vehicles in use in Europe including several characteristics of the national fleets (e.g. vehicle age) as well as data on de-registrations by age. These statistics are compiled by the Spanish association ANFAC and for the present study could be accessed for the years 2008, 2009 and 2010. They are provided electronically (see Annex 1).

- ACEA_ANFAC_20080129_EU_Motor_Vehicles_in_Use_2006.pdf
- ACEA_ANFAC_20090218_EU_Motor_Vehicles_in_Use_2007.pdf
- ACEA_ANFAC_20100427_EU_Motor_Vehicles_in_Use_2008.pdf

As reported by ANFAC via e-mail, data are reported to them by the other national car manufacturer associations integrated in ACEA which in turn obtain them from the respective traffic authorities / ministries. No exact primary sources were indicated by ANFAC.

The work conducted by ANFAC demonstrates that on the national level much more data are available than displayed in international sources as, for instance, Eurostat. This is supported by the observation that, in its publication “ENERGY AND TRANSPORT IN FIGURES, 2010” (Eurostat / DG.TREN, 2010), for the data on new registrations and vehicle stocks the EC refers to ACEA and national sources instead of Eurostat.

The ACEA-ANFAC data were especially valuable when performing fleet balances by age as they provide detailed information on the age distribution of the national fleets (see Chapter 0).

2.1.5 Commercially available data

An extensive literature review was carried out in order to identify commercial sources dealing with the second-hand car market. In result, it turned out that several different commercial sources refer to the data of Datamonitor (see www.datamonitor.com). For test purposes the files for France were purchased (Datamonitor, 2009).

- Datamonitor2009_Used-Cars-in-France.pdf

This document did not prove valuable as it addresses the national market conditions and opportunities only without taking into account any export or import of used cars. As these reports follow a strictly similar structure no more reports of this kind were acquired and this information was not used within the current study.

From the German KBA data, providing information on the re-registration of vehicles previously registered in Germany, were purchased (see Chapter 2.2.4).

Upon recommendation of the automotive industry the potential of the commercial source Polk (<http://eu.polk.com/Products>) was examined. Data were purchased on the age distribution of national fleets for 23 EU Member States. These data provide 15 age classes with a yearly breakdown for vehicles up to 14 years of age and one additional category for vehicles older than 14 years. As this breakdown is much more detailed than the figures from Eurostat Transport (see Chapter 2.1.1) and from ACEA-ANFAC (see Chapter 2.1.4), the Polk figures were used for the derivation of a European scrappage rate followed by calculations on the net import / export of each MS as described in Chapter 2.3.4. As the detailed data used are purchased as a restricted licence they can not be disclosed without POLK's consent.

2.1.6 Previous studies as FLEETS and the revision of the FLEETS data in the most recent REMOVE update

In the context of the FLEETS project (FLEETS, 2008) and the REMOVE database (see <http://remove.org>) the most recent data refer to the year 2005, which does not match the time scope of this project. However, in the field of usage patterns (vehicle kilometres by age) the REMOVE-modelling approach was compared to other sources made out during the project (see Chapter 3). Concerning the cross-border trade of used vehicles FLEETS or REMOVE were not considered as this phenomenon has not yet been included in these models. Rather the present study aims at improving the modelling situation by adding this information to REMOVE.

2.2 National sources

The collection and analysis of internationally available data on European cross-border trade revealed that some European sources were still incomplete or not suitable for the purpose of this study and that much more, and more accurate, information was likely to be found on the national level.

Hence, a survey campaign was carried out to get access to national expertise and sources.

For this purpose about 200 experts from all Member States were approached. Annex 3 displays a list of the institutions approached including an indication on the related feedback (by country in alphabetical order). Unfortunately, only a minority of the contacts proved to be valuable and demonstrated interest to participate. Annex 4 shows the entire questionnaires issued in two subsequent waves as agreed with the client.

The follow-up of the responses to Questionnaire II and their evaluation by Öko-Institut and TML was carried out up to the end of September 2010. Some minor communication continued until December 2010. Beside the questionnaire in some cases a direct personal approach was taken.

The following Chapters 2.2.1 to 2.2.17 show the results of the research into national sources.

2.2.1 Belgium

For Belgium FEBIAC recently published numbers on the export of cars by country of destination (Table 8) reportedly referring to used cars (M1). However, these numbers seem in some aspects contradictory to other reliable results from the survey. On the one hand, for Germany and the United Kingdom, for example, the values are very high. The German KBA reports around 15 000 annual imports of used M1-vehicles from Belgium in recent years whereas Table 8 indicates around 100 000 annual imports.

Table 8: Export of cars (M1) from Belgium for the years 2006 to 2009

N° of exported cars	Export year			
	2006	2007	2008	2009
Country of destination				
Austria	9 281	12 270	9 803	10 157
Bulgaria	564	655	822	316
Cyprus	753	637	453	146
Czech Republic	2 758	1 971	2 697	3 283

N° of exported cars	Export year			
	2006	2007	2008	2009
Country of destination	2006	2007	2008	2009
Germany	146 884	100 724	94 536	100 461
Denmark	9 009	8 566	6 669	3 936
Estonia	182	145	144	68
Spain	70 420	59 088	30 208	23 973
Finland	10 401	11 353	8 446	5 890
France	55 676	44 957	36 949	30 835
Greece	10 889	11 858	7 668	5 083
Hungary	10 525	9 625	9 960	3 947
Ireland	9 762	11 400	8 738	1 681
Italy	68 380	61 790	43 172	34 811
Lithuania	77	81	83	30
Latvia	233	191	119	62
Luxembourg	783	3 543	1 085	2 024
Malta	133	58	674	156
The Netherlands	34 285	30 003	26 167	17 380
Poland	6 491	10 436	12 015	13 069
Portugal	19 881	11 319	13 177	4 804
Romania	1 872	2 004	3 169	580
Sweden	35 408	39 929	23 643	20 719
Slovenia	133	253	1 321	459
Slovakia	373	608	871	734
United Kingdom	153 625	121 635	130 490	107 157

On the other hand only about 10 000 cars exported to Poland each year are mentioned in Table 8. Here, data from the Polish Interior Ministry suggest that the number is around 50 000. Currently there is no explanation for these contradictions at hand.

No numbers on import were made available. In theory, data could become available in the next years with the introduction of systems such as CARPASS and possible streamlining of data exchange between Member States.

2.2.2 Czech Republic

Intensive communication was carried out with experts from the Czech Ministry of Transport. Due to the fact that responsibility for the relevant transport data is not yet harmonised between the Czech Ministry of Transport and the Czech Interior Ministry no comprehensive data sets could be made available from this side.

The data provided by the central register of the Interior Ministry

<http://www.mvcr.cz/docDetail.aspx?docid=2834&docType=ART&chnum=5> and

http://aplikace.mvcr.cz/archiv2008/statistiky/crv/crv08_1/txclk.htm)

up to now refer to the fleet composition only (e.g. by make, age, fuel and motor type) and data maintenance is limited.

However, data were obtained from the Czech Car Importers Association (SDA-CIA) which evaluates data on the fleet entries (new registrations and used car import) and exits (ELV and used car export) based on the statistical activities of the national authorities. Unfortunately, these statistics do not differentiate used car imports and exports between extra- and intra-EU trade. Still, within this project it was found that intra-EU trade generally dominates by far.

The data from SDA-CIA provide information on imported vehicles by category (M1 / N1 etc.), age class (≤ 1 ; >1 to ≤ 3 ; > 3 to ≤ 5 ; > 5 to ≤ 10 ; > 10 to ≤ 15 ; >15 years) and make for the years 2007 to 2009 as well as some monthly values for 2010 (see example Table 9). Similar tables are available for new registrations, used car exports and ELV. The documents are available electronically as addressed in Annex 1.

- CZ_Fleet-entries+exits_2007_SDA-CIA.xls
- CZ_Fleet-entries+exits_2008_SDA-CIA.xls
- CZ_Fleet-entries+exits_2009_SDA-CIA.xls
- CZ_Fleet-entries+exits_half-2010_SDA-CIA.xls

Table 9: Registration of imported used passenger cars in the Czech Republic in 2009 [Source: SDA-CIA]

Make	Age						Total
	1	3	5	10	15	over 15	
Used car imports (M1)							
Alfa Romeo	11	58	177	758	337	17	1358
Audi	383	934	1466	1476	954	81	5294
BMW	328	781	1291	1671	975	337	5383
Citroën	105	617	1646	4811	1335	66	8580
Daihatsu	6	15	23	54	80	23	201
Dodge	18	58	31	14	0	0	121
Fiat	52	294	702	3194	2552	156	6950
Ford	620	3494	5707	7406	3344	183	20754
Honda	72	131	146	340	199	62	950
Hyundai	25	168	286	677	241	4	1401
Chevrolet	26	93	94	303	151	5	672
Chrysler	25	82	156	282	170	8	723
Jaguar	18	12	31	50	19	13	143
Jeep	28	91	100	245	90	26	580
Kia	40	157	226	439	108	2	972
Lancia	2	10	32	235	133	15	427
Land Rover	36	51	72	346	187	13	705
Lexus	29	44	36	29	4	0	142
Mazda	81	233	342	547	324	68	1595

Make	Age						Total
	1	3	5	10	15	over 15	
Used car imports (M1)							
Mercedes-Benz	378	717	636	1270	663	222	3886
Mitsubishi	106	105	105	364	279	72	1031
Nissan	108	212	344	808	374	85	1931
Opel	69	590	1415	2943	1592	142	6751
Peugeot	195	1644	2876	5483	2521	213	12932
Porsche	37	63	38	36	16	25	215
Proton	0	0	0	7	7	0	14
Renault	117	1160	2277	6538	2493	135	12720
Rover	0	0	9	110	100	8	227
Saab	11	36	74	152	87	20	380
Seat	49	260	409	1118	412	21	2269
smart	7	17	42	217	28	0	311
Ssangyong	1	6	12	9	15	1	44
Subaru	83	100	135	247	264	40	869
Suzuki	33	176	229	592	394	225	1649
Škoda	448	2315	5056	9143	2486	17	19465
Toyota	102	369	584	995	221	29	2300
Volkswagen	339	2147	4812	5887	3624	467	17276
Volvo	352	491	748	673	337	27	2628
Others	2	5	3	0	3	2	15
Total other non members CIA	96	217	139	172	72	42	738
Total	4438	17953	32507	59641	27191	2872	144602

For SDA-CIA in conjunction with MDČR, CRV MVČR and AIA created by RTV data, s.r.o.

A general assessment from SDA-CIA was that approx. 40 % of imported used cars have a different identity (engine or other parts) than was originally the case. Reportedly the age is manipulated to lower values in many cases. Hence the information on age and model (motor) should be applied carefully (for instance in the context of emission calculations), taking potential deviations into account.

The age structure of used car imports to the Czech Republic is shown in Figure 4.

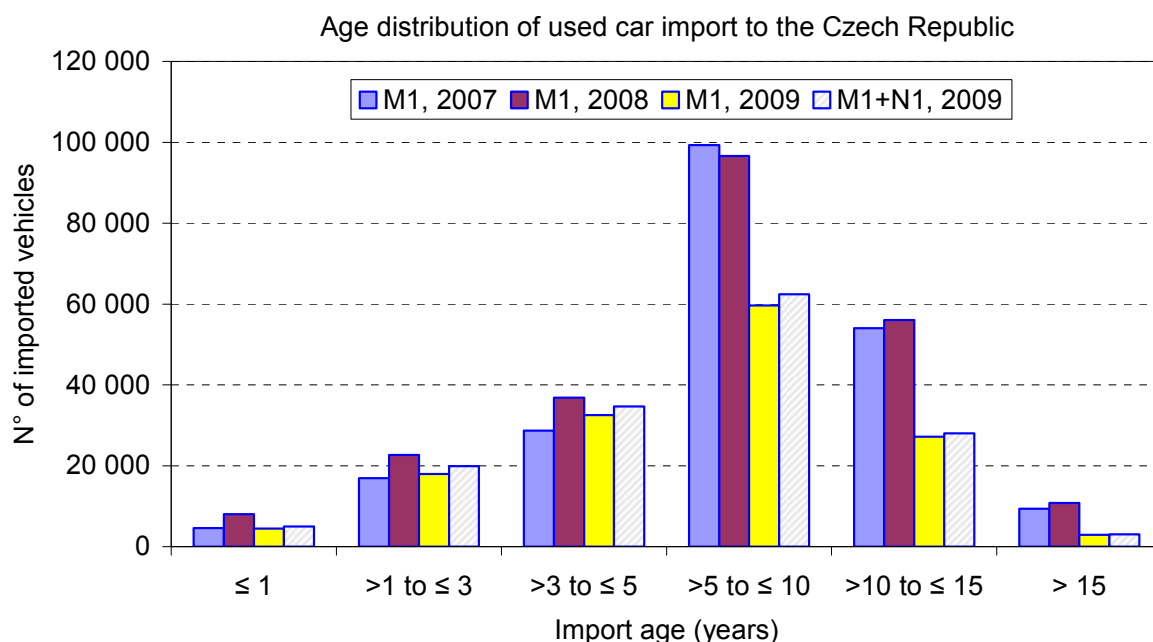


Figure 4: Age distribution of the Czech used car imports (2007 to 2009) [Source: SDA-CIA]

As can be seen, most of the imported cars are between five and ten years old. In 2007 and 2008 even more cars between ten and fifteen years old were imported than cars with an age of between three and five years. In 2009 this relation shifted. Moreover, it becomes clear that significantly fewer cars were imported in 2009 in the older categories than in other years. Whether this was due to the financial crisis or to Czech policy measures or the German scrappage scheme cannot be distinguished. The numbers imported in younger age classes remain approximately constant over the years. The fraction of N1 vehicles is negligible compared to the M1 vehicles as shown for the year 2009. This observation is true for the other years, too.

The comprehensive data on the age structure of Czech imports was used in combination with information on the fleet age distribution obtained from Eurostat to calculate scrappage rates by age for the Czech Republic (see Chapter 2.3.3.3).

2.2.3 Denmark

The Danish Customs (SKAT) keep records of the vehicles (M1 and N1 combined) that are either registered in Denmark or have been previously registered in Denmark and receive a refund of registration tax because of exportation. These data on second-hand vehicle imports and exports include all registrations (and de-registration in the case of exports) in Denmark. Hence, no differentiation between intra- and extra-EU 27 trade can be made. No breakdown by origin/destination, age, motor type, vehicle class or any other characteristics is available.

Table 10: Numbers of used vehicles imported to Denmark and vehicle de-registrations (receiving a refund of registration tax) in Denmark [Source: Danish Customs, SKAT]

M1+N1	2004	2005	2006	2007	2008	2009
"Imports"	23 000	21 000	35 000	57 000	43 000	35 000
"Exports"	4 600	4 600	33 700	63 000	55 000	27 500

2.2.4 Germany

The German Kraftfahrzeugbundesamt (KBA) keeps and maintains the records of the German vehicle registrations. Moreover, the KBA keeps records of vehicles re-registered abroad and previously registered in Germany (German export) as well as of used vehicles registered for the first time in Germany, which have been previously registered abroad (import). This procedure is based on the communication according to Directive 1999/37/EC, Article 5(2).¹

The characteristics of these vehicles (age, motor/fuel type, emission class, etc.) are not recorded. The purpose of the directive is rather the management of the re-registration process. The characteristics of the exported / imported vehicles are not relevant in this context. In general, these records depend on the communication with the other Member States (MS). This communication has reportedly improved, at least since 2008; according to the KBA currently about half of the MS reliably cooperate, whereas others still act reluctantly.

The data for re-registered vehicles previously registered in Germany are shown in Table 11.

A breakdown of the re-registrations outside the EU by 57 non-EU 27 countries is available electronically as addressed in Annex 1. Data for re-registered used cars in Germany previously registered in foreign countries (German import) can be found in this annex, too.

➤ DE_KBA_Re-registrations_20100712.xls

Unfortunately, these data were not free of charge and the German KBA invoiced € 2 900 for the permission to publish these data. It is worth noticing that of those who provided data to the project, the German KBA was the only national authority which claimed payment.

In the wake of the communication with the KBA the possibility of collecting and storing data on the characteristics of the re-registered vehicles (such as age, motor/type and size and emission class) was discussed. In principle this seems possible, but further research is needed on efforts to establish appropriate software for collecting these data and the efforts to maintain the database. The relevant data could still be generated for up to seven years in the past; however, the financial compensation and the time frame of the KBA for the effort envisaged go far beyond the budget of this project.

¹ Directive 1999/37/EC, Article 5(2) "With a view to re-registering a vehicle previously registered in another Member State, the competent authorities shall require the submission of Part I of the previous registration certificate in every case and the submission of Part II if it was issued. These authorities shall withdraw the part(s) of the previous registration certificate submitted and shall keep the latter for a minimum of six months. They shall, within two month, inform the authorities of the Member States which delivered the certificate of its withdrawal. They shall return the certificate which they have withdrawn to those authorities if they so request within six month of its withdrawal."

Where the registration certificate consist of Parts I and II, and the Part II is missing, the competent authorities in the Member State where the new registration has been requested my decide, in exceptional cases, to re-register the vehicle, but only after having obtained confirmation, in writing or by electronic means, from the competent authorities in the Member State where the vehicle was previously registered, that the applicant is entitled to re-register the vehicle in an other Member State."

Table 11: Information on vehicles previously registered in Germany and re-registered abroad
[Source: KBA]

Country of re-registration	2005	2006	2007	2008	2009	01 - 06 2010
Belgium	22	16 437	24 728	22 791	28 212	11 580
Bulgaria		31	51 261	83 619	35 863	26 696
Denmark	1 942	9 802	15 513	10 937	12 864	5 142
Estonia	71	34 993	28 627	12 656	5 208	986
Finland	29 364	26 741	20 921	17 874	13 403	10 822
France	220	817	984	1 000	897	342
Greece	966	1 048	1 073	1 001	886	407
Great Britain	2 696	3 849	2 653	1 730	1 326	1 076
Ireland	115	198	96	33	67	11
Italy	35 591	38 662	32 256	25 755	22 988	9 368
Latvia	59 413	54 673	48 946	35 996	7 520	3 749
Lithuania	295 023	277 579	106 743	60 531	36 473	20 779
Luxembourg	7 236	8 548	7 129	7 244	9 325	4 282
Malta	8	13	1	1	0	0
Netherlands	33 255	49 133	61 149	57 564	53 268	31 644
Austria	2 996	3 040	2 969	2 812	2 456	1 251
Poland	617 030	665 785	716 409	702 030	425 686	195 808
Portugal	583	706	590	501	327	99
Romania	81	99 639	154 244	208 637	131 102	36 964
Sweden	36 110	22 347	18 906	8 388	4 721	4 288
Slovakia	7	5	3	27 316	26 585	5 933
Slovenia	684	304	190	218	200	112
Spain	40 495	43 066	43 283	23 847	10 421	5 269
Czech Republic	3	15	144 993	171 657	82 993	29 783
Hungary	41 594	19 885	18 834	20 606	13 520	3 564
Cyprus	0	0	0	1	8	2
EU 27	1 205 484	1 360 848	1 426 512	1 398 335	862 244	371 681
Extra-EU 27	3 080	1 200	748	95 106	10 576	17 522

The data in Table 11 show that the main destinations of exported German used cars can clearly be made out: in order of significance, they are Poland, Romania, the Czech Republic, Bulgaria and Lithuania. The relations are illustrated in Figure 5; export to countries other than the above-mentioned ones only represents about 18 % of total exports while export to the main destination country - Poland - accounts for nearly one half of the total German export.

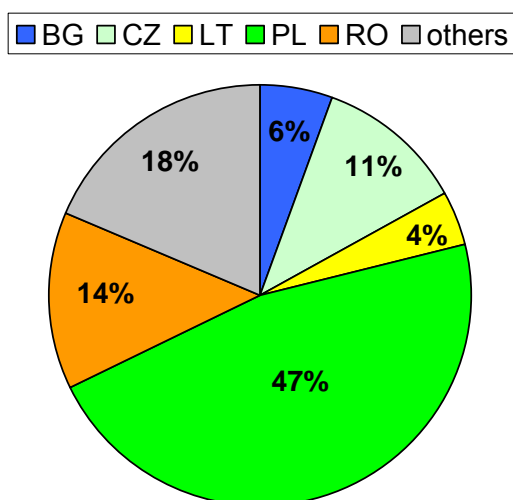


Figure 5: Main destinations of German used car exports [Source: KBA]

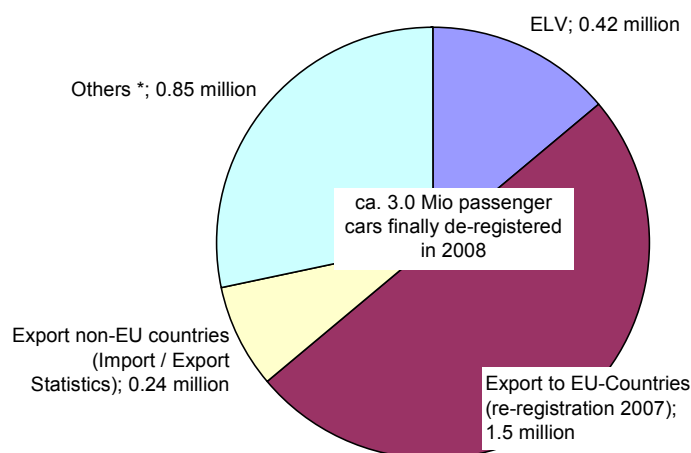


Figure 6: Main destinations of German used car exports [Source: BMU, 2010]

* "Others" might include export for spare parts (without re-registration) and theft (but only < 20,000 per year) and other exports not registered. The figures for collected and treated ELV are claimed to be correct.

Figure 6 depicts the balance of the whereabouts of the finally deregistered passenger cars of Germany. The total number of finally de-registered PC is not exactly known, as statistics on this issue end in 2006; thus the number of 3 million PC in 2008 is an official estimate only. However, it needs to be considered that the destination of a remarkable amount of the approx. 850 000 vehicles exiting the German fleet is not known by the German authorities. They might be exported for use on the road (but not statistically reported) or they might be exported as stock of spare parts not running on the road any more (then to be considered as

ELV export and included in the figures for ELV).

As Germany is a very prominent export country within the EU 27 it might be interesting to conduct a detailed investigation on the effects of this export on the age distribution of the German fleet and “unpolluted”² scrappage rates similar to those performed for several “import countries” (PL, SK, CZ, see Chapter 2.3.3). But as no age distribution is available for the exported vehicles such calculations are not possible. This puts a special interest on the possibility to collect and store data on the characteristics of the re-registered vehicles (especially their age distribution) expressed by the KBA.

2.2.5 Estonia

For Estonia information on imported used cars by age and fuel type was made available by the Estonian Motor Vehicle Registration Centre (ARK) for the year 2009 (see Table 12 and Table 13).

Table 12: Estonian used car imports by age in 2009 [Source: ARK]

Category	Total	<= 2 yrs	2 to <= 5 yrs	5 to <= 10 yrs	>10 yrs
M1	11 089	402	2 039	3 072	5 576
N1	526	28	135	173	190

Compared to other import countries the absolute numbers are rather small. 50 % of the imported used cars are more than ten years old and another 28 % are between five and ten years old, which leads to a rather old import structure. About 60 % of the imports have petrol engines, with the major share (30 % of total imports) being middle-sized.

Table 13: Estonian used car imports by fuel type in 2009 [Source: ARK]

Category	Total	Diesel		Petrol			Others
		< 2 L	> 2 L	< 1.4 L	> 1.4 L < 2 L	> 2 L	
M1	11 089	2 171	2 485	564	3 364	2 500	5
N1	526	112	350	5	10	49	0

2.2.6 Ireland

Data for Ireland were provided by three different entities: the Irish EPA, the Revenue Commissioners/Vehicle Registration Branch (Rev. Com.) and the Society of the Irish Motor Industry (SIMI). As Table 14 shows, the data are not fully consistent. They indicate, however, that in the years 2008 and 2009 about 50 000 vehicles (M1&N1) were imported to Ireland mainly from the United Kingdom and Germany.

² “Polluted” scrappage rates are simply derived from fleet data by calculating the year-to-year change in fleet thus including the effects of import/export.
“Un-polluted” scrappage rates separate the effects of import and export and calculate the “effective” scrappage rate connected to ELV.

Table 14: Import of used vehicles (M1&N1) to Ireland by country of origin

Country of origin	Category	Irish EPA	Rev.Com.	SIMI
		N°	N°	N°
United Kingdom	M1	0	49234	34997
	N1	0	2990	12353
	M1+N1	49234	0	0
Germany	M1	0	143	6968
	N1	0	0	0
	M1+N1	143	0	0
France	M1			1880
	N1			0
	M1+N1			0
Other EU27	M1	0	406	635
	N1	0	0	
	M1+N1	406	0	
Intra-EU27, total	M1+N1	49783	52773	54953
Extra-EU27, total	M1	3011	0	6117
	N1	13	0	
	M1+N1	6036	0	
Source	Type	national	empirical	national
	Year	2008	2009	2009

Note: According to Irish EPA 35 895 vehicles (of the 49 783, i.e. 72 %) were above € 7 000.

Moreover, data were provided by age, by vehicle kilometres as well as by fuel type and motor size (Table 15 to Table 17).

Table 15: Import of used vehicles (M1+N1) to Ireland by age class

Category	Age class	Irish EPA	Rev.Com.	SIMI
		N°	N°	N°
M1	<= 2	0	9 677	13 259
	2 to <= 5	0	17 225	18 411
	5 to <= 10	0	16 676	14 160
	>10	0	5 495	4 767
N1	<= 2	0	0	2 344
	2 to <= 5	0	0	6 155
	5 to <= 10	0	0	3 082
	>10	0	0	772
M1&N1	<= 2	5 387	0	
	2 to <= 5	20 134	0	
	5 to <= 10	20 547	0	
	>10	9 751	0	
Intra-EU27, total	All years, M1+N1	55 819	49 073	62 950
Source	Type	national	empirical	national
	Year	2008	2009	2009

The data show that used car imports to Ireland are greatest in the middle age classes (2 to 10 years). However, according to the Revenue Commissioners and SIMI a considerable

number of vehicles are even less than two years old and significantly fewer vehicles are older than ten years. Strikingly, this last observation is not supported by the Irish EPA. Only a minor share of vehicles has more than 100 000 km at its import. Concerning fuel type and motor size there is a clear trend to small Diesel engines.

Table 16: Import of used vehicles (M1&N1) to Ireland by vehicle kilometres

Vehicle kilometres (vkm)	SIMI	
	N° (M1)	N° (N1)
<10 000	4 778	693
>10 000 < 50 000	17 038	3 495
>50 000 <100 000	19 753	5 087
>100 000	8 194	2 732
Source	national	national
Year	2009	2010

Table 17: Import of used vehicles (M1&N1) to Ireland by fuel type and motor size

Fuel type/ engine size	Irish EPA	SIMI
	N° (M1+N1)	N° (M1)
Diesel <2L	28 946	27 978
Diesel >2L	3 808	5 412
Petrol < 1.4L	6 111	6 398
Petrol >1,4L <2L	8 549	8 528
Petrol >2L	1 316	5 211
Other	0	335
Source	national	national
Year	2009	2009

2.2.7 Spain

The Spanish national transport authority DGT provided data on the intra-EU 27 export of used vehicles for different vehicle classes for the years 2005 to 2009. No data on import of used cars were reported.

Table 18: Exported used vehicles in Spain [Source: DGT]

	2005	2006	2007	2008	2009
M1	91 981	89 978	101 920	145 363	142 368
N1	4 588	6 606	9 459	18 125	21 362
Total	96 569	96 584	111 379	163 488	163 730

The data on exports are taken from the vehicle registers, where according to the DGT the owners request de-registration because they take their vehicle abroad. In this case commercial used car trade would not be included in these numbers. This assumption is supported by the fact that even Eurostat's incomplete intra-EU-27 statistics report considerably larger numbers of vehicles (e.g. 228 834 passenger cars for the year 2008 instead of 145 363 passenger cars according to Table 18).

2.2.8 France

According to the French Ministry of Environment data on the numbers of imported used passenger cars (M1) and light utility vehicles (N1) cannot yet be provided but the Ministry should reportedly be able to do so in the near future (2011 or 2012). Then a differentiation of the numbers by age, fuel type and size of engine will be possible. In 2012, quality will still be limited due to the wrong registration of some old vehicles previously owned by residents of overseas territories or by the state as imported vehicles.

All these statistics will be computed by combining information of the register of vehicles and compulsory technical control of vehicles. This will be done by a project linked with the new French registration system. No information on the export of used vehicles will be available.

From the website of the French Ministry of Environment (Statistics Division SOeS) data on total registrations of used person cars (privately owned/sold) can be obtained.

http://www.statistiques.equipement.gouv.fr/rubrique.php3?id_rubrique=526

These numbers are differentiated by type of car body, fuel type and horse power for 2008. From 2000 to 2008 data are available by fuel type and horse power. However, no statement on the origin of the vehicles is made so that it is not possible to differentiate these numbers between re-registrations inside France and used car imports. Thus, these data are not considered for further analysis in this study.

2.2.9 Italy

The Italian Ministry of Transport provided data on the export and import of used vehicles by origin and destination based on the customs files for the years 2004 to 2008. In addition to the numbers of used passenger cars and used commercial vehicles, the value of the exported vehicles was provided. In Table 19 the export figures for 2008 are displayed as an example. Data for other export years as well as for import are available electronically as addressed in Annex 1:

- IT_IMPORTAZIONE AUTOVEICOLI USATI NUMERO E VALORE_MinTrans.xls
- IT_ESPORTAZIONE AUTOVEICOLI USATI NUMERO E VALORE_MinTrans.xls

In addition, these files provide a detailed breakdown by country of origin / destination for the extra-EU 27 import / export trade.

These records represent the trade between Italy and foreign countries as declared by trade operators at customs and are hence the same as those from Eurostat's intra-EU 27 trade statistics.

Table 19: Exported used vehicles from Italy for the year 2008 [Source: Italian Ministry of Transport]

County of destination	Passenger cars		Commercial vehicles	
	Number	Ø Value €	Number	Ø Value €
Austria	3 441	7 859	346	19 307
Belgium / Luxembourg	2 167	12 475	158	14 716
Denmark	485	9 023	2	18 500
Finland	245	13 987	3	41 000
France	5 188	10 367	111	30 953
Germany	12 448	7 754	1 490	13 106
Greece	224	10 284	588	13 761
Ireland	2	17 300	5	42 100
Netherlands	84	16 495	227	17 305
Portugal	70	8 936	17	48 606
UK	45	16 462	16	61 013
Spain	253	17 448	74	52 287
Sweden	94	12 980	9	23 986
Cyprus	2	14 253	41	18 402
Estonia	168	5 111	4	31 525
Latvia	48	9 137	6	10 050
Lithuania	2 395	3 693	90	4 969
Malta	10	16 985	4	38 015
Poland	2 590	4 756	721	13 147
Czech Republic	3 251	4 916	128	5 295
Slovakia	1 036	4 762	183	16 280
Slovenia	5 881	6 127	1 937	1 660
Hungaria	1 249	6 539	315	9 714
Bulgaria	6 037	2 644	579	9 425
Romania	271	10 626	247	29 434
Intra-EU 27, total	47 684	6 911	7 301	11 495
Extra-EU 27, total	20 594	4 730	11 182	8 463
Total	68 278	6 253	18 483	9 661

2.2.10 Luxembourg

For Luxembourg data on the monetary values of traded goods (export and import) divided by countries were found for the years 2000 to 2009 through the central statistics services. These include the category “Transport Material” which necessarily includes the imported and exported used cars. Still, as there was no means to find out about the percentage of M1 and N1 vehicles within this category no further use can be made of these data for the purpose of this study.

2.2.11 Hungary

Data on the Hungarian import of used vehicles were made available by the Institute for Transport Sciences (KTI) for the years 2005 to 2008. A breakdown by age as well as fuel type and engine size was provided for M1-vehicles. For N1-vehicles a breakdown by load capacity was provided. Most of the imported vehicles come from the EU 27 with the main countries of origin which are DE, AT, CH, IT, BE and NL. Today used vehicle exports from Hungary reportedly are negligible.

Table 20 shows the total numbers of imported used M1- and N1-vehicles. N1-vehicles account for around 25 % of the imports; their numbers have continuously declined in recent years. Around 60 000 M1-vehicles are imported annually.

Table 20: Hungarian used vehicle imports from 2005 to 2008 [Source: KTI]

Year	Imports		
	M1	N1	N1/(M1+N1)
2005	67 040	22 004	25%
2006	49 760	19 370	28%
2007	57 120	16 358	22%
2008	57 666	15 378	21%

The age structure of the M1-vehicles is shown in Figure 7. It shows that by far most of the imported cars are less than two years old, leading to an estimated average import age of approx. four years. This rather young age can be explained by Hungarian taxation which foresees considerably lower registration fees for vehicles of a low-polluting EURO-class (implying young age).

Used car import (M1) to Hungary by age (2005-2008)

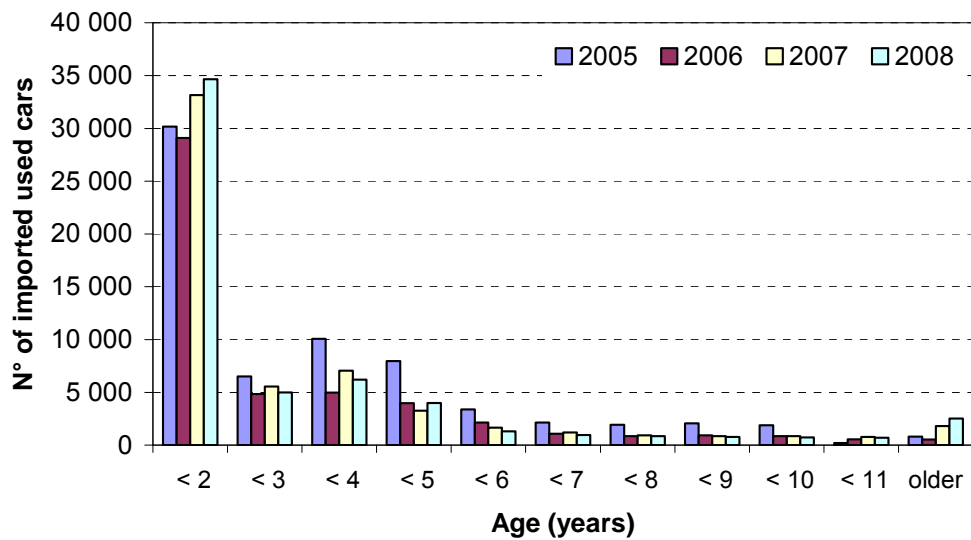


Figure 7: Age structure of the Hungarian used car imports [Source: KTI]

Figure 8 shows the structure of the M1-imports according to fuel type for the year 2008 as an example. It can be seen that in the category < 2 years more petrol than diesel engines are purchased whereas for older ages considerably more diesel engines are bought. This tendency can be observed for the other years (2005 to 2007), too.

Used car import (M1) to Hungary (2008) by age and fuel type

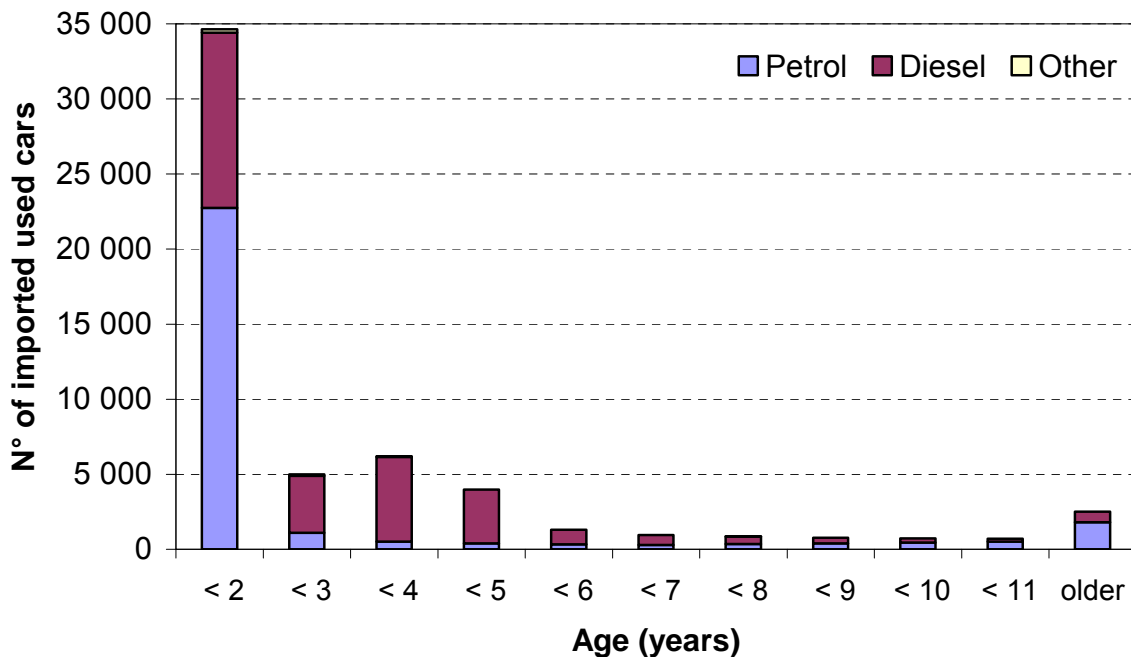


Figure 8: Used car imports to Hungary by age and fuel type for 2008 [Source: KTI]

The data on Hungarian used vehicle import including the more detailed breakdown according to engine size for M1 and load capacity for N1 are available electronically as addressed in Annex 1.

- HU_used-vehicles-import_KTI_2010.xls

2.2.12 Netherlands

As a result of the survey, the Dutch RDW provided a data set on the total import and export of used vehicles differentiated by passenger cars and commercial vehicles for the years 2005 to 2009 as shown in Table 21. A more detailed breakdown according to car characteristics (e.g. age) is reportedly not available to the Dutch authorities.

Table 21: Dutch import and export of used vehicles for the years 2005 to 2009 [Source: RDW]

	2005	2006	2007	2008	2009
Export Passenger Cars	178 000	180 000	208 000	205 000	183 000
Export Commercial Vehicles	106 000	87 000	73 000	70 000	64 000
Import Passenger Cars	45 000	62 000	77 000	78 000	80 000
Import Commercial Vehicles	8 000	11 000	14 000	14 000	11 000

2.2.13 Poland

Following the survey, the Polish Ministry of Interior and Administration (PL Int. Min.) provided a comprehensive set of data available electronically as listed in Annex 1.

- PL_Used-car-EXPORT+IMPORT_M1+N1_IntMin_100730.xls

For the import numbers a database with the following breakdown was provided:

- vehicle class (M1, N1)
- age class (≤ 2 , $> 2 \leq 5$, $> 5 \leq 10$, > 10)
- fuel and motor size (Diesel < 2 L, Diesel ≥ 2 L, Petrol < 1.4 L, Petrol ≥ 1.4 L < 2 L, Petrol > 2 L; Others)
- country of origin.

For the exports, the same breakdown was provided except for the information on the destination of the vehicles.

As an example Table 22 displays the Polish used car imports (M1, all fuel types and motor sizes) for the year 2008 as derived from the database.

Table 22: Polish used car imports (M1) by age for the year 2008 [Source: PL Int. Min.]

Number of cars	Age (Years)				Total
	≤ 2	$> 2 \leq 5$	$> 5 \leq 10$	> 10	
Countries					
Austria	273	1 872	6 236	15 149	23 530
Belgium	442	10 645	33 229	32 216	76 532
Bulgaria	1	14	11	14	40
Cyprus	1	7	19	25	52
Czech Republic	17	120	213	191	541
Denmark	115	698	2 881	5 916	9 610

Number of cars	Age (Years)				Total
	≤ 2	> 2 ≤ 5	> 5 ≤ 10	> 10	
Countries					
Estonia	109	21	18	23	171
Finland	2	13	72	61	148
France	315	19 263	47 015	26 975	93 568
Germany	4 856	59 007	176 151	381 897	621 911
Greece	1	8	30	19	58
Holland	44	1 519	22 252	35 131	58 946
Hungary	3	27	46	40	116
Ireland		1	70	130	201
Italy	115	5 602	43 220	48 342	97 279
Latvia		19	12	16	47
Lithuania	59	124	303	392	878
Luxembourg	33	972	2 274	1 538	4 817
Malta				1	1
POLSKA	9	25	13	41	88
Portugal	1	11	12	14	38
Romania		9	9	2	20
Slovakia	9	47	67	15	138
Slovenia	1	27	42	33	103
Spain	29	2 176	1 698	800	4 703
Sweden	20	271	1 641	3 627	5 559
United Kingdom	19	594	5 242	4 337	10 192
Total	6 474	103 092	342 776	556 945	1 009 287

The age distribution of the total intra-EU 27 imports is illustrated in Figure 9 for the years 2007 to 2009.

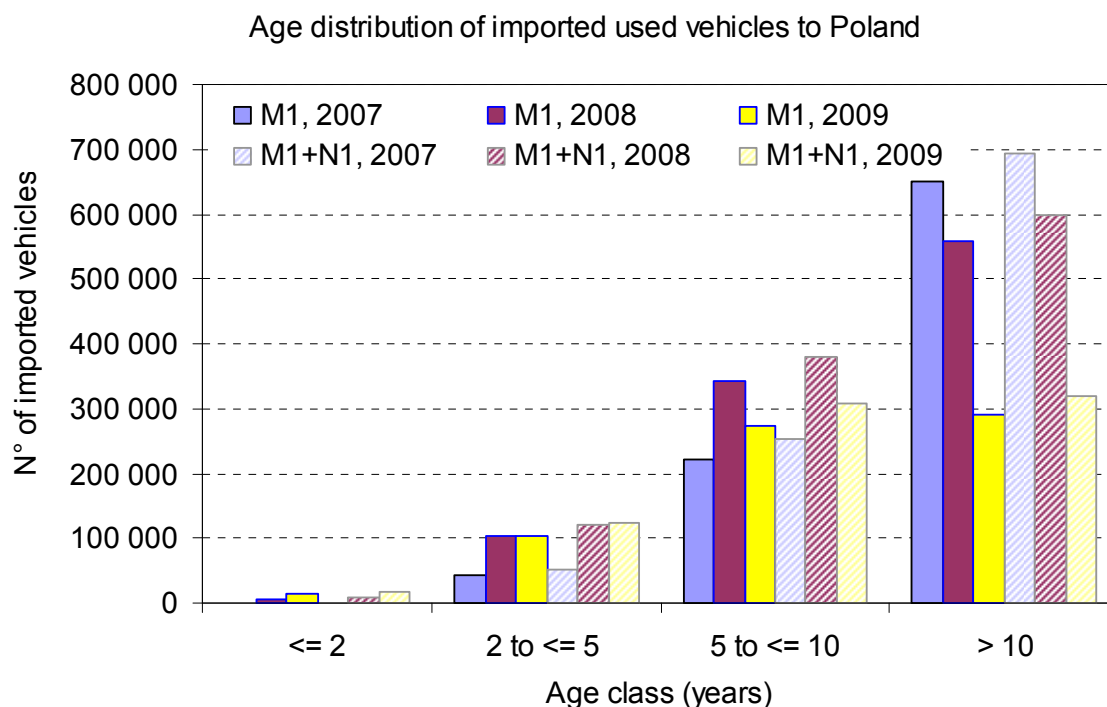


Figure 9: Age structure of the Polish intra-EU 27 used car imports for 2007 to 2009 [Source: PL Int. Min.]

Evidently, the import of very old (> ten years) vehicles has considerably declined in 2009 while the share of younger vehicles has risen slightly. The numbers of imported N1-vehicles are negligible compared to the M1-imports. Figure 10 shows that the majority of these imports are small diesel-driven cars followed by middle-sized petrol engines. The structure of the imports has stayed similar in recent years; in 2009 a slight shift from bigger to smaller diesel engines can be observed.

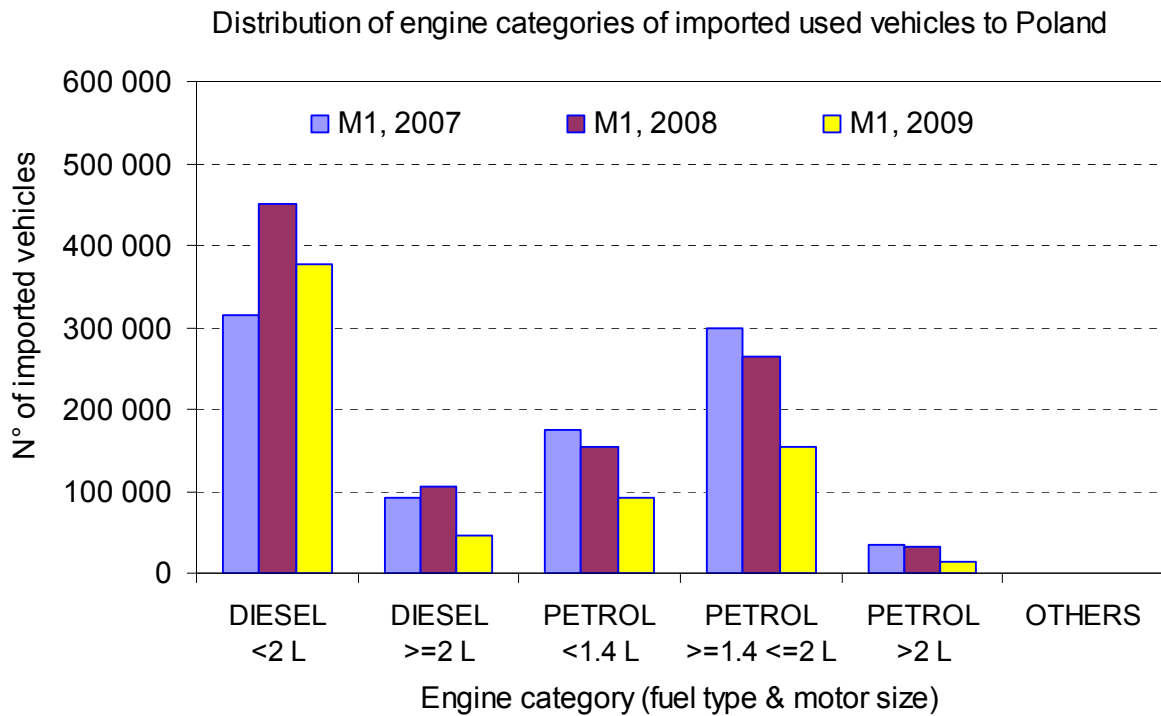


Figure 10: Fuel type and motor size of the Polish used vehicle imports (M1) [Source: PL Int. Min.]

Based on the available data balance calculations for the Polish fleet evolution were performed in order to determine scrappage rates; the corresponding results are presented and discussed in detail in Chapter 2.3.3.1 below.

2.2.14 Slovakia

For Slovakia detailed information was made available on the imported used cars by the Interior Ministry (SK Int. Min.): individual registrations from 2005 to 2010 including age (date of first registration and day of re-registration in the Slovak Republic), vehicle category, make, motor type, different emissions and vehicle status (in operation, de-registered, etc.). The original data are provided electronically as addressed in Annex 1:

- SK_imports_2005-2010_IntMin.xlsx

For evaluation purposes these data were processed and consolidated after continued communication with the expert; the outcome is contained in

- SK_imports_2005-2010_IntMin-processing101011.xlsx.

No information on the intra-EU 27 export of used cars from Slovakia is available. However, Slovakia tends to be an import rather than an export country so that export numbers are deemed negligible. In Eurostat's intra-EU 27-trade statistics the ratio between Slovak imports

and exports is around 10:1; even considering the incompleteness of the source, this factor still serves as an indicator. The more complete extra-EU 27-trade statistics confirm this trend. Figure 11 shows the numbers of the imported used cars (M1) and their age distribution for the years 2005 to 2009. It can be seen that today Slovakia mostly imports cars aged between four and six years and around ten years. The peak around ten years went down considerably in 2009 which might be partly due to the German scrappage scheme and/or changes of the tax regime. The table inside the figure refers to vehicles where no proper first registration date was indicated in the database. Hence, the age of the vehicles could not be calculated. To obtain total import values these numbers have to be added on top of the import numbers given in the figure. On request it was confirmed that these are usually older vehicles; due to improved reporting their numbers have gone down significantly in recent years.

Age distribution of imported used passenger cars (M1) to Slovakia

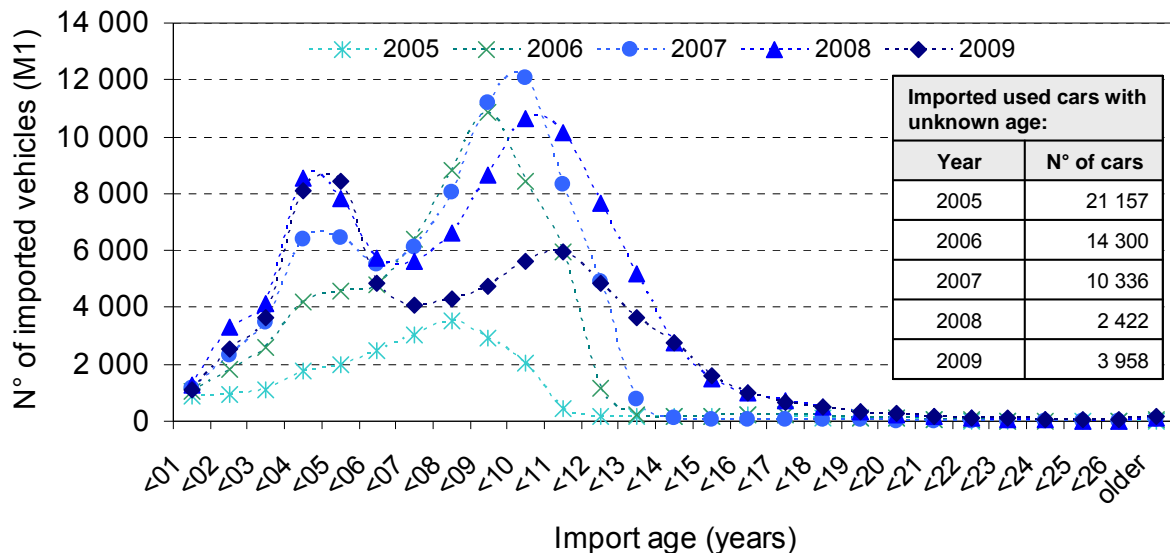


Figure 11: Used car imports to the Slovak Republic for the years 2005 to 2009, differentiated by age [SK Int. Min.]

Given the detailed data set, balance calculations for the Slovak fleet evolution were carried out (see Chapter 2.3.3.2).

Since 2008 the Automotive Industry Association ZAPSR publishes a registration survey of individual imported used vehicles (M1 and N1) to the Slovak Republic on a monthly basis where the imported vehicles are listed by make and category. These are available on

<http://www.zapsr.sk/kategoria/Statistiky/Dovezene-automobily/>

but do not include information on the age of the car or its motor type. Hence, for further evaluation (see Chapter 2.3.3.2) only the database provided by the Interior Ministry was used.

2.2.15 Finland

The Association of Automobile Importers in Finland AUTOTUOJAT ry provided information on imported used vehicles (M1) by age as displayed in Table 23. Figure 12 shows the age structure of these imports for the years 2005 to 2009.

Age distribution of imported used passenger cars (M1) to Finland

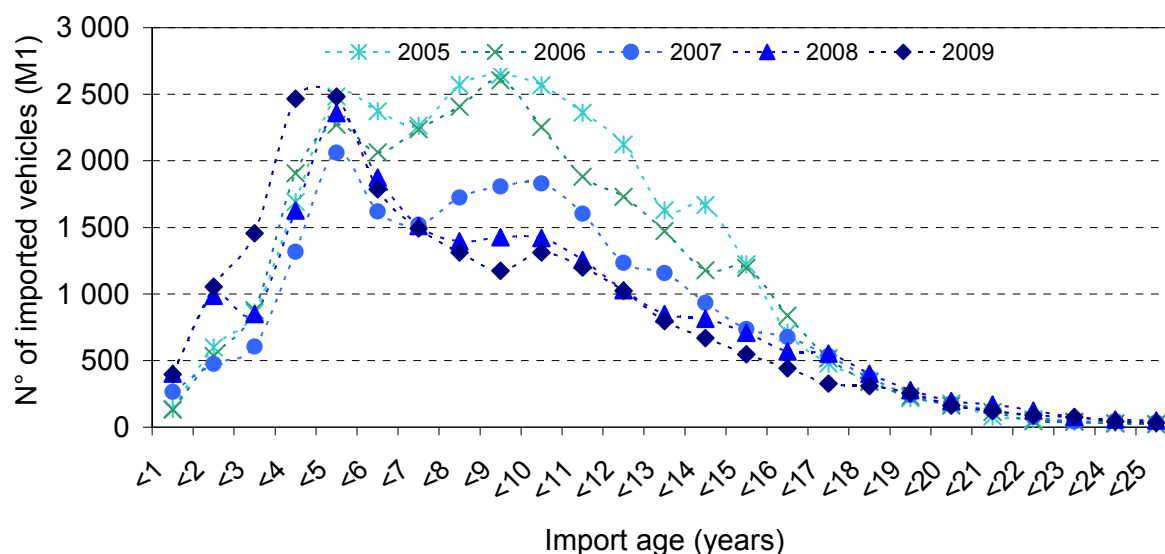


Figure 12: Age structure of Finnish used car imports (M1) [Source: Autotuoajat ry]

It shows that most of the cars are about four years old. Interestingly, in the years 2005 and 2006 there were still large numbers of older vehicles (around ten years) being imported. This share has continuously declined in recent years. According to AUTOTUOJAT the main origins of import are Germany and Sweden.

Table 23: Imported used vehicles to Finland for the years 2003 to 2009, differentiated by year of first registration (age) [Source: Autotuoajat ry]

Year of first registration (abroad)	Year in which imported used cars were first registered in Finland						
	2009	2008	2007	2006	2005	2004	2003
2009	396	-	-	-	-	-	-
2008	1 053	402	-	-	-	-	-
2007	1 455	986	265	-	-	-	-
2006	2 466	850	475	130	-	-	-
2005	2 482	1 626	604	534	138	-	-
2004	1 787	2 359	1 317	878	600	128	-
2003	1 492	1 874	2 061	1 907	861	545	137
2002	1 311	1 510	1 620	2 272	1 690	671	455
2001	1 174	1 396	1 520	2 065	2 484	1 708	887

Year of first registration (abroad)	Year in which imported used cars were first registered in Finland						
	2009	2008	2007	2006	2005	2004	2003
2000	1 311	1 425	1 724	2 237	2 372	2 403	1 818
1999	1 199	1 421	1 808	2 406	2 264	2 307	2 137
1998	1 023	1 255	1 830	2 605	2 570	2 566	2 242
1997	797	1 028	1 602	2 254	2 646	2 777	2 380
1996	668	849	1 234	1 881	2 568	3 022	2 830
1995	546	813	1 158	1 730	2 361	2 843	2 952
1994	441	708	934	1 472	2 122	2 863	3 388
1993	327	568	737	1 177	1 628	2 259	2 819
1992	308	552	677	1 196	1 669	2 417	3 207
1991	255	400	534	838	1 223	1 617	2 298
1990	162	278	371	517	710	913	1 305
1989	122	195	240	338	478	683	859
1988	88	170	176	231	347	521	718
1987	75	124	126	162	218	315	428
1986	42	75	77	112	178	176	293
1985	31	57	41	46	79	112	145
1984	29	48	45	40	61	70	85
1983	26	33	33	26	42	49	61
1982	14	36	31	21	30	28	36
1981	37	42	40	22	25	25	32
1980	26	33	38	19	20	21	16
1902-1979	1 452	1 461	697	509	344	342	416
Total	22 595	22 574	22 015	27 625	29 728	31 381	31 944

In general, the data indicate a decline of intra-European used car imports between 2003 and 2009. In contrast, the Finish Road Statistics (FRS, 2009) state that *“During the past decade, passenger traffic on the highways has been influenced by changes in vehicle taxation. The growth in car traffic has increased clearly after vehicle taxes were lowered in 2003. The number of used cars imported into the country has also increased, ...”*.

No data for export were given by AUTOTUOJAT as the registration tax effectively prevents the export of used cars. The tax return is possible from 2010 but practically not in use.

2.2.16 Sweden

For Sweden data on the absolute numbers for exports and imports were reported by the Swedish Transport Agency for the year 2009 only (see Table 24).

Table 24: Used vehicle ex- and import from / to Sweden in 2009 [Source: SE Transport Agency]

2009	M1	N1
Exports	44 189	6 094
Imports	21 000	3 000

According to Finnish sources (AUTOTUOJAT) Sweden is, besides Germany, one of the major exporters to Finland. Also Hungary (KTI) mentioned Sweden as one of the main countries of origin of their used car imports. The numbers of Swedish used vehicle imports are only half those of exports.

2.2.17 Other countries

For the rest of the Member States no or too little / too unreliable information on second-hand car trade within the EU 27 was found.

For Austria different experts³ consistently stated that no such information is available. The expert of BMW Austria suggested that in principle at least the import of used vehicles should be registered because car buyers have to pay the so-called NoVA (Normverbrauchsabgabe, a special tax payable when a car is registered in Austria for the first time) to the tax office. Unfortunately no information could be obtained whether information is stored and if so, of what kind and where.

For Great Britain extremely small numbers of imports were indicated in the British registration database by the Department for Transport. At the same time it was stated that these might not be totally accurate.

Unfortunately, no experts from Bulgaria, Romania, Slovenia, Lithuania and Latvia contributed to the survey. Neither did Portuguese or Greek experts. No data were obtained for Cyprus and Malta.

³ Verband der Versicherungsunternehmen Österreichs (Austrian licensing authority), Austrian EPA, Porsche Austria / Weltauto, BMW Austria, Statistik Austria, Eurotax Glass's

2.3 Detailed evaluation and results

2.3.1 Global fleet balance for EU 27

In order to estimate the accuracy and quality of the data sources in general, a global fleet balance was established for M1 and N1 vehicles for the whole of the EU 27 Member States according to

$$0 = N_{n-1} - N_n + IMPORTS_n + New\ Reg_n - EXPORTS_n - ELV_n - UNKNOWN_n \quad (\text{Equ. 1})$$

where

N:	Number of vehicles in the fleet
IMPORTS:	Extra-EU 27 imports
NewReg:	Registration of new vehicles within EU 27
EXPORTS:	Extra-EU 27 exports
ELV:	End-of-Life Vehicles (reported)
UNKNOWN:	Number of vehicles with unknown fate (positive numbers = fleet exit, negative numbers = fleet entry)
Index n:	Reporting year

The different components of the balance and their respective amounts as well as the sources used are displayed in Table 25 for the years 2005 to 2008.

Table 25: Global balance of the whereabouts of vehicles for the years 2006 to 2008

Balance Component	2005	2006	2007	2008	Source
FLEET (as per end of year)					
M1	220 223 000	224 676 000	229 764 000	234 081 000	1)
N1	26 862 088	27 740 738	28 430 594	29 262 765	2)
Total	247 085 088	252 416 738	258 194 594	263 343 765	

Change in fleet					
M1+N1		5 331 650	5 777 856	5 149 171	

EXPORT - extra-EU27					
M1		899 835	1 155 614	892 739	3)
N1		163 958	143 019	137 277	4)
Total		1 063 793	1 298 633	1 030 016	

IMPORT - extra-EU27					
M1		229938	227112	241408	3)
N1		9 416	10 001	9 961	4)
Total		239 354	237 113	251 369	

NewReg					
M1		15 450 400	15 605 000	14 361 600	1)
N1		2 021 116	2 151 202	1 931 215	5)
Total		17 471 516	17 756 202	16 292 815	

ELV – reporting					
ELV - M1+N1		5 972 591	6 495 167	6 263 963	6)

UNKNOWN whereabouts					
Unknown - M1+N1		5 342 836	4 421 659	4 101 034	

1)	EC (EUROSTAT / DG.TREN): Energy and Transport in Figures 2010
2)	ACEA / Anfac: European Motor Vehicle Parc; Estimation for missing values (BG, CY, EE, HU, LU, MT, RO, SI, SK: all years; LT: 2005): N1 = 0.8*Goods-Vehicles (Source 1), all estimates represent not more than 6% of the N1 fleet; Spain 2006: estimate for missing value Spain: 4 631 579 (average of 2005 and 2007)
3)	EUROSTAT - Comext for used motor cars and other vehicles principally designed for the transport of persons (CN8: 87032190, 87032290, 87032390, 87032490, 87033190, 87033290, 87033390)
4)	EUROSTAT - Comext for used motor vehicles for transport of goods <= 5 tonnes (CN8: 87042139, 87042199, 87043139, 87043199)
5)	ACEA (http://www.acea.be/index.php/news/news_detail/new_vehicle_registrations_by_country/); MT and CY: from Eurostat
6)	EUROSTAT, EDC WASTE: National reporting for ELV Monitoring

The quality of Eurostat's data on extra-EU 27 trade is comparatively good as the reporting threshold is rather low. The reliability of the data on fleet composition (Eurostat; ACEA/ANFAC) and new registrations (ACEA) is high, too.

The quality of the reported numbers of ELV is comparatively weak as:

- several countries report that the number of CoDs issued is smaller than the real number of ELVs treated; and
- many countries report that the amount of ELVs is not known and only ELVs with CoDs are reported.

Thus we suggest that the majority of the missing vehicles are to be considered as ELV. Figure 13 illustrates the result of the global EU 27-balance for the year 2008.

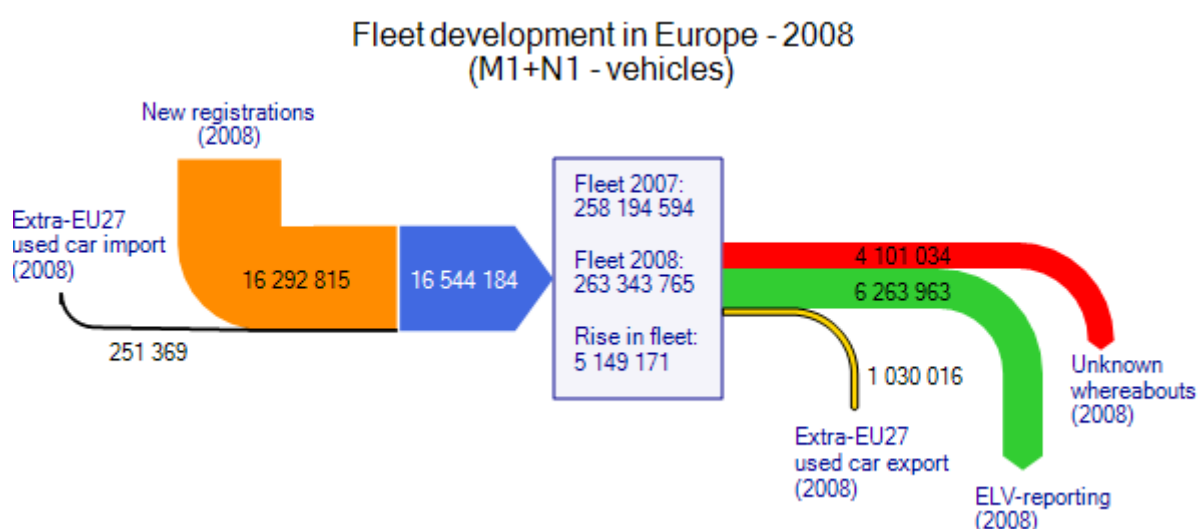


Figure 13: Global balance of the EU 27-fleet for the year 2008

It can be seen that the European fleet grows considerably (+2 % in 2008). Moreover, the unaccounted-for vehicles which have to leave the fleet in order to close the balance (4 101 034 units) represent 36 % of the total exit and 80 % of the net change in stock. For the EU 27 the relation between fleet exits (used car export, ELV and unknown whereabouts) and entries (used car imports and new registrations) is 1:1.4. New registrations are by far the main source of entries to the fleet (98.5 %). Thus it can be stated that for the EU 27-aggregate, used car imports plays a very minor role. This observation needs to be distinguished from the national level where in many countries import / export of used vehicles plays a more important role for the fleet composition as demonstrated in the next Chapter 2.3.2.

2.3.2 Relevance of cross-border trade for national fleet compositions in EU 27

The aim of the following exercise is to estimate the percentage of the annual import / export of M1- and N1-vehicles compared to the registration of new vehicles in the Member States (MS). Such indicator displays the importance of the cross-border trade for the composition of the fleet on the national level.

The sources used for the estimation of the minimum annual import / export numbers are the following:

Eurostat data on intra-EU 27 trade (Comext) for used cars. Even if these data are broken down by seven types of vehicles for M1 and four types for N1, the coverage regarding the complete trade is rather limited as the data are reported by the commercial operators and the reporting thresholds are high (see Table 1) depending on national regulations (see Chapter 2.1.2.1). As is known, a significant share of such trade is operated by small entities and are therefore not considered in Comext. In order to make use of possibly smaller reporting thresholds applied by other MS for intra-EU 27 reporting, the “mirror data” are considered as well (e.g. if you are looking at export data, the first source is the export reported by the MS itself (reporter) and the mirror data are the import data reported by the other countries (partners) from the MS in question). The maximum value given in the data reported by the reporter or his partners is considered as the more reliable value. For more information on the data extracted from the Comext database and the evaluation of the quality of these data, please refer to Chapter 2.1.2.1.

National sources from Germany, Poland and other MS as available. The German KBA provided data on export by destination (see Chapter 2.2.4). In case this reported German export is higher than the import from Germany reported by Eurostat for the related MS, these Eurostat data are replaced by the German figures. The same applies for the sum of the German and Polish imports (see Chapters 2.2.4 and 2.2.13). If these are higher than the export to Germany and Poland reported by the related MS in Comext, the Comext data are replaced by these German and Polish figures. In addition, several countries provided figures for their intra-EU 27 export/import. When these exceed the values given by any of the aforementioned sources they are used as the best-available estimate.

Eurostat data on extra-EU 27 trade (Comext) for used cars. These data are considered to be much more reliable than the intra-EU 27 trade data (see Chapter 2.1.2.2) and hence directly used in the calculations.

The detailed calculations carried out in order to obtain the best estimate for import / export for each MS (separately for M1 and N1) are attached in Annex 5 including the related information on sources.

It is important to always keep in mind in the course of data interpretation in this context that the estimated figures reflect minimum values and that the effective import/export might be even higher.

Table 26 shows the consolidated results. The third column displays the registrations of new vehicles as reported by DG.TREN and Eurostat (Eurostat / DG.TREN, 2010) which mainly refer to data provided by ACEA. The estimated (“corrected”) import and export figures are calculated as described above. To display the range of systematic underestimation of the intra-EU 27 used-vehicle trade by Comext, the fifth column shows a comparison of the Comext data for intra-EU 27 trade with the corrected estimates. It has to be noted that a factor of 1.0 does not necessarily indicate accurate Comext intra-EU 27 data but may simply mean that no better data are available.

With respect to the relation of exports to imports and the registration of new vehicles, the

following patterns can be identified:

- Group 1: With high relevance of imports ($\geq 60\%$ compared with the annual registration of new cars) and low relevance ($< 15\%$) of exports are BG, CY, CZ, GR, LV, MT, PL, RO and SK. EE, with an export share of 18%, might be considered for inclusion in this group as well.
- Group 2: Imports are of medium relevance ($\geq 16\%$, $\leq 33\%$) and exports of small relevance ($\leq 2\%$) for FI, HU, IE.
- Group 3: DK has both medium imports and medium exports. It is not a typical importer or exporter but apparently is simply well integrated. The differences in value and age (and origin and destination) of the imports and exports are not considered in this assessment and might be an issue of further research.
- Group 4: In the case of BE, NL and SI, imports are of medium relevance ($\geq 15\%$, $< 30\%$) and exports of high relevance ($\geq 60\%$; $\geq 52\%$ in the case of LU). It seems that the impact of transit demand needs to be considered here. However, all these countries have a high degree of net export (export – import) – between 23% and 45% – comparable to the net export of Germany (48%) (see Group 5).
- Group 5: Imports are of low relevance ($< 15\%$) in the case of AT, DE, ES, FR, IT, PT, SE and UK. Germany, with its high share of exports (55%), is somewhat an exception in this group; all others reportedly have export rates which are below 22%.
- Group 6: LT is seemingly an exception as it appears to be a shipment centre with high imports from EU 27 and high exports to extra-EU countries; in terms of net imports (around 155%) it is in the range of LV and GR.

The total EU 27 indicates balanced imports (23%) and exports (26%). This is due to the fact that extra-EU 27 export / import is negligible compared to used vehicle trade within EU 27. The export / import flows within EU 27 need to level out. This is well illustrated by the numbers in the table below: 3 444 031 estimated minimum intra-EU 27 imports vs. 3 211 638 estimated minimum intra-EU 27 exports. However, significant differences between EU 15 and EU 12 become visible. Obviously most of the EU 12-countries are importing a significant share of their “new-registered” vehicles as used vehicles from EU 15.

Table 26: Consolidated results of the estimations for the relevance of imports and exports (M1 & N1) to the composition of the national fleets for the year 2008.

Group	Country	ACEA New Registrations (M1 + N1)	Import (M1+ N1)				Export (M1 + N1)			
			Estimated minimum EU-27	Correction compared to import from Comext	Extra EU-27	Import (incl. extraEU) / NewReg	Estimated minimum EU-27	Correction compared to import from Comext	Extra EU-27	Export (incl. EU Extra) / NewReg
1	PL	375 936	1 105 615	19.18	38 418	304%	6 777	26.07	33 127	11%
	BG	55 236	151 407	2.05	13 059	298%	281	2.68	1 140	3%
	LV	21 872	40 734	14.08	2 790	199%	987	3.49	1 634	12%
	GR	289 500	397 558	1.00	648	138%	427	4.64	179	0%
	SK	96 940	101 191	14.85	2 757	107%	1 023	2.38	160	1%
	CZ	202 823	203 926	4.19	2 530	102%	3 256	3.84	5 800	4%
	CY	28 444	8 909	1.00	15 576	86%	86	21.50	65	1%
	MT	5 666	887	2.53	3 298	74%	112	112.20	14	2%
	RO	307 409	222 323	16.89	984	73%	44 239	198.38	86	14%
EE	27 555	14 844	4.44	2 210	62%	2 168	2.37	2 886	18%	
2	IE	179 770	56 000	31.57	3 024	33%	939	46.95	119	1%
	FI	156 006	24 622	9.71	2 630	17%	1 266	5.10	618	1%
	HU	174 837	28 600	20.65	218	16%	1 507	2.03	1 691	2%
3	DK	183 746	42 106	9.52	894	23%	51 670	2.61	3 330	30%
4	LU	56 387	16 662	1.41	39	30%	28 486	1.43	1 044	52%
	BE	603 493	168 092	2.79	5 277	29%	196 118	2.25	221 482	69%
	SI	78 857	19 945	1.09	304	26%	2 432	1.02	47 600	63%
	NL	584 572	92 000	7.24	8 171	17%	283 636	14.57	77 308	62%
5	SE	293 251	24 000	38.28	8 438	11%	16 488	15.66	5 754	8%
	AT	326 460	31 053	1.01	1 481	10%	63 135	1.91	8 526	22%
	DE	3 313 565	178 323	1.79	54 326	7%	1 557 774	6.88	274 621	55%
	ES	1 327 048	80 980	1.12	8 335	7%	246 959	1.07	6 898	19%
	FR	2 509 219	97 980	1.36	5 632	4%	249 460	2.61	29 993	11%
	PT	268 787	10 750	13.26	300	4%	2 562	75.35	6 112	3%
	IT	2 385 564	64 236	1.58	3 387	3%	388 936	7.44	23 976	17%
	UK	2 418 953	8 852	1.06	22 100	1%	52 062	1.37	26 831	3%
6	LT	25 217	252 435	1.02	44 543	1178%	8 853	1.00	249 022	1023%
	EU 27	16 297 112	3 444 031		251 369	23%	3 211 638		1 030 016	26%
	EU 15	14 896 321	1 293 214		124 682	10%	3 139 918		686 791	26%
	EU 12	1 400 791	2 150 816		126 687	163%	71 721		343 225	30%
	EU 11*	1 375 574	1 898 381		82 144	144%	62 868		94 203	11%

* without LT

≥ 0.15	Threshold 1
≥ 0.30	Threshold 2
≥ 0.60	Threshold 3

2.3.3 National fleet balances and scrappage rates

The prediction of fleet emissions of CO₂ and other relevant components is based on mathematical modelling of the fleet structure. The relevant parameter for emissions is the vehicle technology described by motor type and emission class. For the prediction it is assumed that vehicle technology is a function of the age of a vehicle. Hence, in order to predict fleet emissions it is interesting to know the age distribution of the fleet and to be able to forecast its evolution. This is done by balancing the entries and exits of vehicles of a certain age into / out of the fleet.

A crucial parameter when describing fleet exits is scrappage. There, scrappage is described as a function of the car's age because, for example, an increasing age leads to an increased probability of breakdown.

An example of such modelling is the model developed by the FLEETS (FLEETS, 2008) project which describes scrappage as a function of the vehicle's age according to a modified Weibull distribution with two additional parameters.

$$\varphi(k) = \exp\left[-\left(\frac{k+b}{T}\right)^b\right]; \varphi(0) = 1 \quad (\text{Equ. 2})$$

where

$\varphi(k)$: Probability that a vehicle will survive k years after its registration

k : Age of the vehicle

b : Failure steepness for the vehicle ($b > 1$ implies that the failure rate increases with time)

T : Characteristic service life for the vehicle

In the FLEETS project the parameters b and T were derived empirically by fitting the equation to fleet evolution data for Germany.

Up to now a general problem with this approach, also integrated into the TREMOVE model for all European countries with more or less important modifications (TREMOVE, 2007), has been that in the modelling scrappage represents all fleet exits, i.e. it does not differentiate between vehicle exports and "real" scrappage due to breakdown. Moreover, in the TREMOVE balances entries to the fleet have only been modelled up to now as registrations of new vehicles, leaving aside used car imports.

It is hence interesting to try and describe "non-polluted" scrappage functions which take into account scrappage due to vehicle breakdown only and to incorporate used car imports and exports into the balance. For this each car age has to be modelled separately so that a matrix of balances is obtained according to Equation 3:

$$SCRAPPAGE_{n,m} = N_{n-1,m-1} - N_{n,m} + IMPORTS_{n,m} - EXPORTS_{n,m} \quad (\text{Equ. 3})$$

where

- SCRAPPAGE: Fleet exits due to breakdown of the vehicle (end-of-life vehicles)
N: Number of vehicles of a certain age in the fleet
IMPORTS: Imports to the national fleet (divided into extra- and intra-EU 27 imports)
EXPORTS: Exports to the national fleet (divided into extra- and intra-EU 27 exports)
Index n: Reporting year
Index m: Age of the vehicle

Note: New registrations of new cars enter the fleet as vehicle imports of age = 0 years in year n.

For some example countries, import / export data with sufficient detail could be gathered within this project so that an attempt could be made to derive empirical non-polluted scrappage functions. The results are described in the following Chapters 2.3.3.1 to 2.3.3.3 for Poland, Slovakia and the Czech Republic, all three of which are relevant importers of used vehicles.

2.3.3.1 Poland

The data provided for the Polish import and export of used cars by the Polish Interior Ministry are comparatively well detailed (see Chapter 2.2.13). Most importantly, the data differentiate the imported and exported vehicles by age classes. Moreover, a description differentiated by age classes is available from Eurostat's Transport Database for the Polish fleet (see Chapter 2.1.1). Reliable data on the registration of new vehicles on the national level are published by ACEA (see Chapter 2.1.4). Based on this detailed information on the fleet and imports and exports, the aim was to establish a comprehensive balance for the Polish M1-fleet for the most recent years in order to derive "non-polluted" scrappage functions as explained above.

The fleet age distribution is given by Eurostat for four age classes (≤ 2 , $2 < \leq 5$, $5 < \leq 10$ and > 10 years). These classes need to be broken down by single years of age in order to be able to apply Equation 3. The same is true for the data on the used car imports and exports provided by the Polish Interior Ministry.

So each class was split into the respective ages by single year by applying percentages. For the age distribution of the fleet these percentages were split in such a way as to give a probable/conventional curve. For imports and exports the split percentages were at first evenly distributed between the single years of age. After having established the balances these percentages were used as parameters for tuning the system.

The export data provided by the Polish Interior Ministry reportedly cannot be differentiated by country of destination and hence must be thought to contain all destinations. However, when cross-checking with the data on extra-EU 27 trade from the Comext database, it was found that Comext reports considerably higher volumes (Table 27).

Table 27: Polish extra-EU 27 exports according to different sources

Polish extra-EU27 exports	2005	2006	2007	2008	2009
Interior Ministry	3 035	6 317	7 642	6 013	7 663
Eurostat / Comext	13 483	26 613	51 466	27 024	

It was then concluded that the Comext data be integrated into the balance in addition to those reported by Polish Interior Ministry. Unfortunately, Comext does not differentiate traded vehicle volumes by age at all. For dividing the data in the necessary way as described above, the same age distribution was assumed to apply as was the case with the export data from the Polish Interior Ministry.

Concerning extra-EU 27 imports the Comext data and those reported by the Polish Interior Ministry match quite well, having in mind the overall uncertainties of the data (see Table 28). Hence only the data reported by the Polish Interior Ministry were used for the balance.

Table 28: Polish extra-EU 27 imports according to different sources

Polish extra-EU27 imports	2005	2006	2007	2008	2009
Interior Ministry	11 490	21 167	29 751	57 313	31 236
Eurostat / Comext	20 079	18 763	24 637	36 621	

The assumptions concerning the differentiation by age led to uncertainties in the balance. Hence it is interesting to take a look at the results of the global balance (for all years) first of all. For Poland the following results were reached (see Table 29).

Table 29: Global balance of the Polish fleet evolution

Balance Components	2005	2006	2007	2008	2009
Fleet [Eurostat-Transport]	12 339 000	13 384 000	14 589 000	16 080 000	
Extra-EU import [Int. Min.]	11 490	21 167	29 751	57 313	31 236
Intra-EU import [Int. Min.]	418 154	776 344	914 895	1 009 287	683 826
New registrations [ACEA]	235 522	238 993	293 305	320 040	320 206
Export [Int. Min.]	3 035	6 317	7 642	6 013	7 663
Extra-EU export [Comext]	13 483	26 613	51 466	27 024	
Results	2005	2006	2007	2008	2009
Change in fleet		-1 045 000	-1 205 000	-1 491 000	
Change in fleet + entries		-8 496	32 951	-104 360	
Scrappage (Equ. 3)		-41 426	-26 157	-137 397	

Negative value for "Change in fleet" = rising fleet

Negative value for "Change in fleet + entries" = imports + new registration are smaller than the rise in fleet indicating incomplete data.

Negative value for "Scrappage" = the net entries (import + new registrations – exports) are smaller than the rise in fleet indicating incomplete data.

From the resulting change in fleet (fleet in year n-1 minus fleet in year n) it can be seen that the Polish fleet grows steadily and considerably (by approx. 1 to 1.5 million cars each year). More strikingly, the results for the annual change in the fleet plus the entries reported (used car imports + new registrations) show that in 2006 and 2008 these entries do not even compensate the increase.

Considering the ELV scrapped in Poland (which according to Eurostat amounted to 189 871

for 2008), at least 327 268 (137 397 + 189 871) entries are missing for a closed balance in 2008. Furthermore the indicated number of ELV is by far too small. A number of 189 871 reported ELV represents a scrappage rate of approx. 1.4 % only (calculated with the average of the fleet for 2005 to 2008). Taking into account a probable average scrappage rate for the entire fleet of 7.5 % would add additional “missing entries” of 950 000 cars per year.

This shows that the reported import numbers still fall short of reality. In theory, the entries need to compensate for the growth of the fleet as well as the exports and ELV (scrappage).

Even taking into account the good database from the Polish Interior Ministry there are still too few used car imports to Poland being reported. Another reason can be that the number of vehicles in the fleet does not consider all de-registrations appropriately and that the rise in fleet is less than deduced from the provided figures. In any case, no indication on scrappage can be deduced from these numbers.

Table 30 and Table 31 depict a similar trend when looking at the results of the balances for the single years of vehicle age. However, the intensity of the above described effect varies for different ages.

At younger ages and especially between ten and fifteen years the Polish fleet grows as indicated by the negative values for the change in the fleet (in red in Table 30). The values in the first line (ages < 1 year) represent the registrations of new vehicles (300 000 to 400 000 each year). The fleet becomes smaller again in the case of vehicles above fifteen years of age.

When integrating the net cross-border trade (see Table 31) these increases are compensated in some cases by high net imports and even real scrappage seems to take place. Strikingly, scrappage seems to occur (in small quantities) in the case of vehicles between three and five years of age. One explanation for this could also be that data on the export of vehicles of this age are still incomplete. “Real” scrappage can be calculated for cars older than fifteen years. Especially between ten and fifteen years large quantities of unaccounted-for imports seem to exist.

Table 30: Change in the Polish fleet for different car ages

Age (years)	2006	2007	2008
<1	-326 000	-342 000	-419 500
<2	-3 000	-16 000	-77 500
<3	29 667	-10 333	-25 000
<4	13 333	-43 000	-30 667
<5	13 333	-43 000	-30 667
<6	-198 683	-194 917	-143 967
<7	-17 850	17 100	7 950
<8	-186 300	-145 650	-152 150
<9	-192 250	-139 950	-149 500
<10	-29 750	28 500	13 250
<11	-205 460	-314 670	-498 810
<12	-200 030	-235 370	-265 020
<13	-209 630	-246 950	-277 990
<14	-134 400	-162 120	-181 580

Age (years)	2006	2007	2008
<15	-49 570	-65 710	-72 200
<16	129 690	138 690	159 530
<17	73 660	77 020	89 060
<18	92 860	100 180	115 000
<19	112 060	123 340	140 940
<20	46 430	50 090	57 500
older	196 890	219 750	250 320
TOTAL	-1 045 000	-1 205 000	-1 491 000

Positive value = declining number of cars in the year n+1 for the age class m+1 compared to the previous year (n) in class age (m)

Negative value = rising number of cars in the year n+1 for the age class m+1 compared to the previous year (n) in class age m

Table 31: Calculation of “scrappage” from the Polish fleet for different car ages, taking into account imports and exports (net cross-border trade)

Age (years)	2006	2007	2008
<1	-87 007	-48 695	-95 053
<2	-3 000	-16 000	-73 093
<3	35 393	5 346	16 958
<4	19 059	-27 321	11 291
<5	19 059	-27 321	11 291
<6	-174 536	-149 996	-73 063
<7	6 297	62 020	78 854
<8	-162 153	-100 730	-81 246
<9	-168 103	-95 030	-78 596
<10	-5 603	73 420	84 154
<11	-64 880	-174 962	-376 590
<12	-59 722	-96 127	-143 046
<13	-69 593	-108 172	-156 262
<14	-66 280	-95 987	-122 439
<15	-793	-18 924	-29 882
<16	133 515	140 643	162 759
<17	78 028	79 903	92 781
<18	97 770	103 994	119 213
<19	117 513	128 084	145 645
<20	52 154	55 299	62 451
older	261 456	284 395	306 478
TOTAL	-41 426	-26 157	-137 397

Negative value for “Scrappage” = (reported) net imports are too small to calculate any “real” scrappage

The numbers provided in Table 30 and Table 31 vary according to the settings chosen for the age distribution of the import (as explained earlier). However, when varying the age distribution for single years for the used car import it was found that the general observations made above are quite robust against variations.

All basic data and the calculations described in this chapter are available electronically as addressed in Annex 1.

- FleetBalance_PL+SK+CZ_101209.xls

Taking the above into consideration, the following conclusions might be drawn:

- Even if the degree of detail of the data for Poland is exceptional the register on imports / exports of vehicles or the fleet register seem to need improvement. Combining the different sources and calculating the scrappage rates discovers discrepancies in the balance of at least 330 000 entries (import) or exits of the car register not reported (missing deregistration). Taking reasonable scrappage rates of 7.5 % into account an additional amount of one million “missing entries” is estimated. “Missing entries” might be caused by unreported imports or vehicles not correctly deregistered (kept in the register but scrapped or exported).
- The common statistical approach for applying an age class ≥ 10 years for older cars is no longer suitable. Taking into account the longer life-span of the vehicles and the fact that the majority of cars enters the market being older than 10 years, at least two more classes are needed: 10 to 15 years, 15 to 20 years and ≥ 20 years.
- Considering the fact that the national authorities maintain the register with the exact date of registration anyhow this improvement is simply a question of aggregation and a detailed breakdown by single years of car age would enable much more evaluation than the age classes (aggregating more than one year).
- The balances have been performed with data from Eurostat for the fleet and with national data for the imports. The fleet data from Polk (see Chapter 2.3.4) indicate a more slowly rising fleet with only 360 000 to 560 000 more cars registered per year compared to the 1 to 1.5 million additional cars registered per year according to the Eurostat data. This points to the need for a revision of the fleet data with an emphasis on the more reliable national sources.
- Using the detailed age breakdown of the fleet data from Polk (by single years of age up to an age of 14 years) in the balance calculations, it showed that assumptions of a certain split to divide aggregated vehicle age classes by single years of age might lead to biased results. For instance the data from Polk indicate considerably more older cars than estimated from the calculation above. Again this underpins the need of high quality fleet data maintained on the national level (offering an age distribution by single years of age).

2.3.3.2 Slovakia

A similar approach as described in Chapter 2.3.3.1 was used for Slovakia. The aim was again to establish a comprehensive balance for the Slovak M1-fleet for the most recent years in order to derive “non-polluted” scrappage functions.

For Slovakia very detailed data on second-hand car imports by different years of age are available from the Interior Ministry. These data could be integrated directly into the balance without having to adapt the age distribution as was the case for Poland. However, the database also includes a rather large category of (presumably older) cars, where no statement on the car’s age could be made. In order to integrate these into the balances, this share was split up evenly between eleven parts: “< 11” to “< 20” and “older”. For the data on

Slovak imports no statement about the origin of the vehicles was made so that it has to be assumed that they refer to the total Slovak import. Upon comparison of the numbers to the extra-EU 27 imports for Slovakia as reported by Comext, the extra-EU 27 share is very small in any case (Table 32).

No data on intra-European exports are available. The extra-European export activities are comparably small so that they were neglected for the purpose of this balance (compare Table 32). It can be assumed that the intra-European exports are negligible as well.

Table 32: Extra-EU 27 exports and imports for Slovakia [Comext]

	2005	2006	2007	2008
Extra-EU 27 export	84	432	306	134
Extra-EU 27 export relative to Imports [Int. Min.] and NewReg [ACEA]	0,1%	0,3%	0,2%	0,1%
Extra-EU 27 import	400	2 791	1 983	2 741
Extra-EU 27 import relative to Imports [Int. Min.]	0,9%	3,7%	2,3%	2,9%
Extra-EU 27 import relative to Imports [Int. Min.] and NewReg [ACEA]	0,4%	2,1%	1,3%	1,7%

Data on the fleet age distribution are available from ACEA/ANFAC for the years 2007 and 2008. These are differentiated by year of age for cars up to ten years of age. For older ages there is only one total value which had to be sub-divided into eleven parts (< 11 years to < 20 years, older) in order to be able to integrate it into the balances. The percentages for this split were used to tune the result as was the case with Poland.

Global numbers on vehicles in the fleet are available for the years 2005 to 2008 from Eurostat. Using these, the global balance was established for the years 2006 to 2008 by integrating the import data from the Slovak Interior Ministry and neglecting the export (Table 33).

Table 33: Global balance of the Slovak fleet evolution

Balance Components	2005	2006	2007	2008
Total fleet [Eurostat]	1 303 700	1 333 700	1 433 900	1 544 900
Import [Int. Min.]	43 810	76 454	87 549	95 272
New Registrations [ACEA]	57 125	59 084	59 700	70 040
Export [neglected]	-	-	-	-
Results	2005	2006	2007	2008
Change in fleet		-30 000	-100 200	-111 000
Change in fleet + entries		105 538	47 049	54 312

Negative value for "Change in fleet" = rising fleet

At first sight for Slovakia reasonable (positive) values for fleet exits can be calculated (see last line in Table 33); as exports can be considered negligible, these values tend to reflect scrappage. Comparing these calculated values to the numbers reported for ELV from Slovakia according to the ELV Directive (Table 7), it shows that the amounts of reported and calculated ELV come closer over the years. In 2006 considerably less ELV (approx. 15 000) were reported than estimated by the balance in Table 33 whereas in 2008 the reported value (approx. 40 000) already represents 73 % of the calculated value. Considering the 54 312

cars as scrapped leads to a scrappage rate of 3.5% only. This still is an unlikely low level. Using the detailed ACEA/ANFAC data on the fleet age distribution a balance by single years of age can be carried out for the Slovak fleet for 2008 (Table 34). It shows that even if the global balance (Table 33) offers positive scrappage numbers there still seems to be a gap in reporting on imports for car ages up to ten years (negative values). Above ten years scrappage sets in.

Table 34: Detailed balance for the Slovak fleet evolution in 2008 according to age

Age (yrs)	Fleet [ACEA/ANFAC]		Imports [Int. Min.]	Scrappage [calculated] (+small n° of export)
	2007	2008	2008	2008
New Registrations			70 040	
<1	60 031	73 456	1 279	-2 137
<2	71 669	73 750	3 287	-10 432
<3	68 868	76 482	4 140	-673
<4	63 835	90 010	8 551	-12 591
<5	68 429	82 518	7 831	-10 852
<6	69 702	81 127	5 729	-6 969
<7	74 327	80 659	5 613	-5 344
<8	67 651	82 692	6 590	-1 775
<9	71 882	77 368	8 650	-1 067
<10	89 785	87 504	10 635	-4 987
<11	101 881	103 507	10 369	-3 353
<12	101 881	103 507	7 898	6 272
<13	87 327	88 720	5 400	18 561
<14	80 049	81 327	2 988	8 988
<15	72 772	73 933	1 714	7 830
<16	65 495	66 540	1 228	7 460
<17	58 218	59 147	958	7 306
<18	50 940	51 753	705	7 169
<19	43 663	44 360	535	7 116
<20	36 386	36 967	425	7 122
older	29 109	29 573	745	36 667
TOTAL	1 433 900	1 544 900	165 312	54 312

Negative value for "scrappage" = missing entries: (reported) net imports are too small to calculate any "real" scrappage

Up to ten years of age the input values ("fleet" and "imports") did not have to be modified in order to fit into the annual balances as they are based on detailed indications by ACEA / ANFAC (see Chapter 2.1.4) and the Slovak Interior Ministry. Above ten years there are uncertainties due to the percentages chosen for splitting the number of cars by single years of car age. In any case, the general tendency is evident that there is scrappage in this

category (> 10 years) (see Table 34).

All basic data as well as the calculations described in this chapter are available electronically as addressed in Annex 1.

- FleetBalance_PL+SK+CZ_101209.xls

Taking the above into consideration, the following conclusions might be drawn:

- The Slovak Ministry of Interior provided outstanding details for the break down by age of the imported cars.
- If the aforementioned sources, especially the ACEA / ANFAC database, are providing correct data, at least approx. 60 000 units of imported vehicles are missing in the age category < 10 years. (Or the maintenance of the vehicle register should be improved).
- This would increase the scrappage value (54 312 cars for 2008 in the last line of Table 33 and Table 34) to approx. 110 000 units (compared to the reported amount of approx. 40 000 in 2008 according to Table 7).
- Compared to the total fleet (approx. 1.5 million vehicles, see Table 33) these 110 000 units mean that scrappage amounts to approx. 7 %. Compared to the vehicles of over ten years old in the fleet, this percentage rises to approx. 15 %. Both figures are at the lower end of reasonable scrappage rates.
- The calculations have been performed with data from Eurostat and ACEA/ANFAC for the fleet and national data for the imports. The fleet data from Polk (see Chapter 2.3.4) report the same numbers for the total fleet.
- In comparison to the breakdown by age from ACEA/ANFAC (and our estimations) the data provided by Polk indicate an older fleet. Again this underpins the need for high quality fleet data on the national level and for an improved international accessibility of these sources.
- Even if the balances reveal that the data situation is still not complete, the very detailed data set on the imported vehicles by age and various other characteristics (see Chapter 2.2.14) is of high interest and worth to be considered for an evaluation of the generic data derived from the data from Polk in Chapter 2.3.4.

2.3.3.3 Czech Republic

The third country for which detailed balances on the M1-fleet evolution were carried out in order to find out about scrappage rates was the Czech Republic.

For this purpose, data on the fleet age distribution differentiated according to age class were taken from Eurostat's Transport database (see Chapter 2.1.1). As was the case for Poland these classes were broken down by different years of age in order to be able to apply Equation 3. Each year of age obtained a certain percentage for the distribution within one class. These percentages were then adjusted in such a way as to give a probable/conventional fleet age distribution curve.

Similarly, the data on imports provided by SDA-CIA and differentiated according to age class (≤ 1 ; ≤ 3 ; ≤ 5 ; ≤ 10 ; ≤ 15 ; > 15 years) were split. According to SDA-CIA Czech used car exports are small compared to imports (Table 35).

Table 35: Czech used car exports and imports [SDA-CIA]

	2007	2008	2009
Imports	212 869	230 974	144 602
Exports	7 037	8 151	12 041
Exports/Imports	3.3%	3.5%	8.3%
Exports/(Imports+NewReg)	2.0%	2.2%	3.9%

The relevance of exports for the Czech Republic is slightly higher than for the Slovak Republic. Hence, exports were included in the global balance. In the detailed balances export was omitted as the values remain relatively small and no indication on the age distribution has been made by SDA-CIA.

Data on new registrations can be obtained from SDA-CIA or from ACEA. As shown in Table 36 these data deviate by approx. 25 - 30 % for the years 2006 to 2008. For 2009 they tally well. For the balances the data from SDA-CIA were used as this organisation also provided the import and export data.

Table 36: New registrations in the Czech Republic according to different sources

New registrations (M1)	2006	2007	2008	2009
SDA-CIA	123 987	132 542	143 661	161 659
ACEA	156 686	174 456	182 554	167 708
Delta	26%	32%	27%	4%

The above-described components led to the following global balance (Table 37):

Table 37: Global balance of the Czech fleet evolution

Balance components	2005	2006	2007	2008	2009
Fleet [Eurostat-Transport]	3 954 947	4 105 893	4 275 893	4 419 967	
Import [SDA-CIA]			212 869	230 974	144 602
Export [SDA-CIA]			7 037	8 151	12 041
New Registrations [SDA-CIA]			132 542	143 661	161 659
Results	2005	2006	2007	2008	2009
Change in fleet		-150 947	-170 000	-144 073	
Change in fleet + entries			175 411	230 562	
Scrappage			168 374	222 411	
ELV [SDA-CIA]			84 450	160 686	239 712
ELV [ELV Directive]		56 582	72 941	147 259	

It can be seen that the Czech fleet is about three times larger than the Slovak fleet; imports are about 2.5 times higher, and new registrations by about a factor of 2. This implies that turn-over of the Czech fleet is slightly slower. With about 150 000 additional vehicles per year the relative growth rate of the Czech fleet is also smaller compared to the Slovak one (approx. 100 000 additional vehicles per year in the last two years). The imports reported by SDA-CIA compensate this growth well and, even considering used car exports, positive scrappage results for the years 2007 and 2008. Comparing these calculated values for scrappage (168 374 and 222 411 units) with the ELV reported by SDA-CIA (the penultimate line in Table 37) it can be seen that the latter are much smaller. The numbers of ELV

reported according to the ELV Directive (see also Table 7) tally better with the ELV data according to SDA-CIA. This observation can be due to the fact that the export data are incomplete. More probably, however, this is due to an underestimation of ELV (e.g. vehicles destructed without CoD).

With the available data a detailed balance by single years of car age could be carried out for the years 2007 and 2008 (Table 38).

Presumably incomplete import numbers can also be observed in the case of the Czech fleet despite the overall balance which leads to seemingly plausible (i.e. positive) scrappage. For the Czech Republic there is an obvious underestimation of the used car imports for the ages from six to twelve years. Above twelve years considerable scrappage (or unreported export) sets in. This observation is quite comparable to the Slovak situation in Chapter 2.3.3.2, even if for Slovakia an underestimation of import data is obvious for younger ages, too. Again it could be found that the described tendency is quite robust against variations of the percentages used for splitting the used-car-import data aggregated for age classes by single years.

Table 38: Calculation of “scrappage” from the Czech fleet for different car ages

Age (yrs)	2007*	2008*
<1	7 602	9 694
<2	5 965	-1 167
<3	-8 995	-217
<4	3 472	11 205
<5	6 578	14 495
<6	11 928	11 059
<7	4 288	-1 721
<8	-6 924	-13 661
<9	-6 716	-14 902
<10	-5 356	-15 062
<11	-34 534	-60 851
<12	-39 154	-29 690
<13	-19 045	-7 692
<14	3 054	15 566
<15	29 844	42 886
<16	52 084	64 863
<17	33 254	42 583
<18	37 234	45 103
<19	16 414	21 563
<20	18 404	22 823
older	66 014	73 683
TOTAL	175 441	230 562

* excluding exports

Negative value for “scrappage” = missing entries: (reported) net imports are too small to calculate any “real” scrappage

In this case at least approx. 120 000 and 145 000 units of imported vehicles seem to be

missing, especially between six and twelve years for the years 2007 and 2008, respectively. These would have to be added on top of the calculated overall scrappage values (175 441 and 230 562 cars for 2007 and 2008 respectively; last line of Table 38), resulting in 300 000 units in 2007 and 375 000 units in 2008. The total annual amount of minimum additional imports varies with the percentages used for splitting the age classes into different years of age as described above. However, the order of magnitude remains the same.

Compared to the reported scrappage in Table 7 of 73 000 vehicles for 2007 and 147 000 vehicles for 2008, it seems to be a high, but not unreasonable, level: Compared to the total Czech fleet the estimated scrappage of 300 000 to 375 000 amounts to a scrappage rate of approx. 7 - 8 %. Compared to the number of vehicles in the fleet aged ten years and older, a share of approx. 12 % or 14 % results. These percentages are very similar to those calculated for Slovakia (see Chapter 2.3.3.2).

Table 39: Share of estimated scrappage compared to the Czech fleet

Numbers of	2007	2008
Estimated scrappage	296 135	375 525
Total fleet	4 275 893	4 419 967
Fleet > 10 years	2 480 000	2 606 000
Scrappage/total fleet	7%	8%
Scrappage/fleet > 10yrs	12%	14%

All basic data as well as the calculations described in this chapter are available electronically as stated in Annex 1.

- FleetBalance_PL+SK+CZ_101209.xls

The calculations have been performed with data from Eurostat and ACEA/ANFAC for the fleet and national data for the imports. The fleet data from Polk (see Chapter 2.3.4) report the same numbers for the total fleet (with very small deviations up to 0.2%).

In comparison to the age breakdown from ACEA/ANFAC (and our estimations) the data from Polk indicate an older fleet. Again this underpins the need for high quality fleet data on the national level and for an improved international accessibility of these sources.

Even if the balances reveal that the data situation is still not complete, the rather detailed data from SDA-CIA are of high interest and worth to be considered for an evaluation of the generic data derived from the data from Polk in Chapter 2.3.4.

2.3.4 Derivation of an average EU 27-scrappage rate from data purchased from POLK

The purpose of the subsequent calculations is to set up a model that may provide an overview of changes in the car fleet by year and age class in the second-hand car market in the EU to illustrate important import/export patterns in this domain.

2.3.4.1 Method

The model applied is a stock-flow model where the number of cars in a specific country may be calculated as the number of vehicles the year before minus scrapped vehicles plus vehicles imported minus vehicles exported:

$$N_t^c = N_{t-1}^c * (1 - S_y) + I_y^c - E_y^c$$

Where N is the number of vehicles, c is an index for country, t is the year, S is the scrappage rate⁴, I is imports and E is the exports of vehicles.

The imports into one country equals the sum of exports from all other countries into this country in year y :

$$I_y^c = \sum_{j \neq c} E_y^j$$

The model operates with one-year age groups for vehicles up to 14 years of age. Vehicles above 14 years constitute one group.

2.3.4.2 Data

The data source is a database from POLK⁵, containing the European passenger car fleet (M1) and light duty vehicles fleet (N1). The database contains vehicles in use distributed on one-year age groups up to 14 years in 23 of 27 EU countries. Bulgaria, Romania, Cyprus and Malta are not included in the database.

The database contains no data for UK in 2004 and 2005 and no data for Estonia, Latvia and Lithuania in 2004. Data for these missing years has been constructed by back casting.

Data for Spain in the years 2004 to 2005 seems inconsistent with other valid data sources. To avoid misleading conclusions based on these inconsistent data it was decided to disregard reported 2004 and 2005 numbers for Spain and construct the 2004 and 2005 numbers for Spain using back casting.

⁴ The sum of age and accident scrappage

⁵ POLK is a privately held global company which provides automotive information and marketing solutions to the automotive world and its related industries. See also comments in Section 2.1.5

2.3.4.3 Passenger cars, M1

This subsection presents scrappage rates, imports and exports and illustrative examples of passenger cars.

2.3.4.3.1 Scrappage

The general idea of the model is that by aggregating all relevant countries, imports and exports will net out, and total exits in one age group from one year to the next year will be scrappage. The table below shows the sum of all countries reported.

Table 40: Sum of passenger cars (M1), 2004-2009 by age group.

	2004	2005	2006	2007	2008	2009
Age ≤ 1	14,906,974	14,810,882	14,949,690	14,698,484	13,558,375	13,721,299
1 < Age ≤ 2	14,617,126	14,868,681	14,789,056	14,583,019	14,587,705	13,590,436
2 < Age ≤ 3	14,607,091	14,529,516	14,798,827	14,493,996	14,615,788	14,759,619
3 < Age ≤ 4	14,800,154	14,516,173	14,467,540	14,418,220	14,274,501	14,556,736
4 < Age ≤ 5	14,758,010	14,732,897	14,446,003	14,160,464	14,388,779	14,350,767
5 < Age ≤ 6	15,072,194	14,696,867	14,634,666	14,139,135	14,130,098	14,440,182
6 < Age ≤ 7	14,033,408	14,992,193	14,625,509	14,297,177	14,118,951	14,144,434
7 < Age ≤ 8	12,955,644	13,886,630	14,894,037	14,240,922	14,233,855	14,033,183
8 < Age ≤ 9	11,943,515	12,726,280	13,691,392	14,394,332	14,094,031	14,008,602
9 < Age ≤ 10	11,000,783	11,581,669	12,387,796	13,016,858	14,096,387	13,640,369
10 < Age ≤ 11	10,153,356	10,506,264	11,099,889	11,575,633	12,593,178	13,490,380
11 < Age ≤ 12	8,837,801	9,499,303	9,883,096	10,095,074	10,996,439	11,742,134
12 < Age ≤ 13	9,406,224	8,047,369	8,737,075	8,725,171	9,398,574	9,923,138
13 < Age ≤ 14	8,343,350	8,318,063	7,197,927	7,398,428	7,877,108	8,207,069
Age > 14	35,620,032	37,344,912	39,331,878	38,229,566	38,527,883	39,999,606
Total	211,055,662	215,057,699	219,934,381	218,466,479	221,491,652	224,607,954

Comparing one age group with the one-year-older age group in the next year provides the scrappage figure from this age group. For instance, there were 14 698 484 vehicles in age group "Age ≤ 1" in 2007. In 2008, this age group is one year older ("1 < Age ≤ 2"), and now there are only 14 587 705 vehicles. This means that $14\,698\,484 - 14\,587\,705 = 110\,779$ vehicles corresponding to 0.8% left this age group from 2007 to 2008.

Assuming that all countries are included, imports and exports will net out, and the 0.8% will be the scrappage rate for this age group. However, as explained above, some countries are left out of the model, and since the scrappage rate seems rather high for this age group, it indicates that exits also include some export to other countries.

The table below shows the scrappage rates for all years calculated according to this methodology.

Table 41: Scrappage rates for EU (M1), 2005-2009.

Age	2005	2006	2007	2008	2009	Average
1	0.7%	1.2%	-2.5%	-0.8%	0.2%	-0.2%
2	0.3%	0.5%	-2.0%	0.2%	1.2%	0.0%
3	-0.7%	-1.0%	-2.6%	-1.5%	-0.4%	-1.3%
4	-0.7%	-0.7%	-2.1%	-0.2%	0.5%	-0.6%
5	-1.5%	-1.5%	-2.1%	-0.2%	0.4%	-1.0%
6	-2.7%	-2.1%	-2.3%	-0.1%	0.1%	-1.4%
7	-2.1%	-1.5%	-2.6%	-0.4%	-0.6%	-1.5%
8	-2.3%	-1.5%	-3.4%	-1.0%	-1.6%	-1.9%
9	-4.2%	-3.6%	-4.9%	-2.1%	-3.2%	-3.6%
10	-5.9%	-5.8%	-6.6%	-3.3%	-4.3%	-5.1%
11	-7.2%	-7.3%	-9.1%	-5.0%	-6.8%	-7.1%
12	-9.4%	-9.2%	-11.7%	-6.9%	-9.8%	-9.4%
13	-12.3%	-12.3%	-15.3%	-9.7%	-12.7%	-12.5%
14	-16.0%	-9.2%	-17.8%	-15.6%	-13.8%	-14.5%

Since there are fluctuations from year to year, it is expected that calculating the average over several years will give a more reliable estimate of the scrappage rates.

The figure below shows the average scrappage rates.

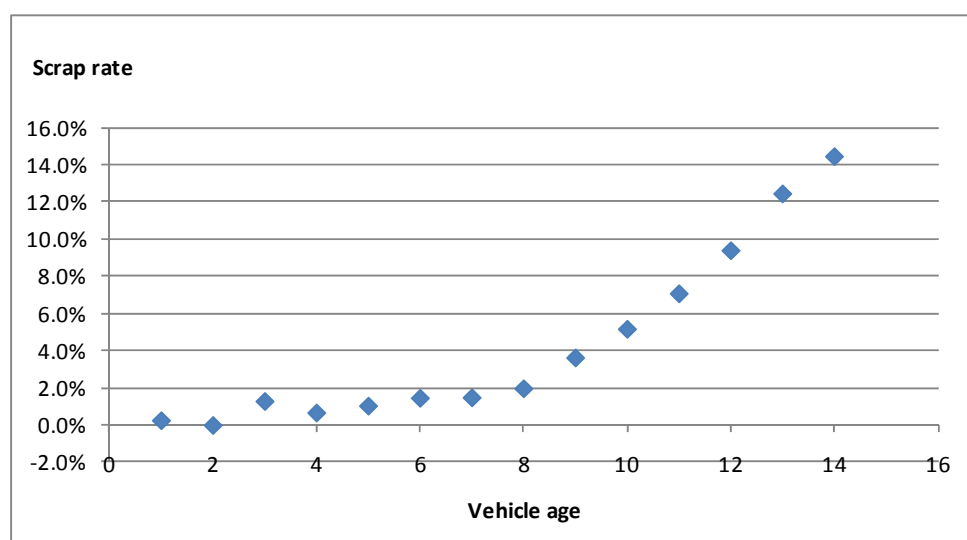


Figure 14: Average scrappage rates for EU, (M1) 2005-2009.

Although we did not include all countries due to lack of data, these scrappage rates look acceptable. It seems reasonable that scrappage in the first years are low. After eight years, the scrappage rate begins to increase due to aging of vehicles. For the oldest age group, there is a considerably higher scrappage rate compared with previous years.

2.3.4.3.2 Imports and exports

Assuming the above scrapping rates gives a reasonable picture of the scrapping of vehicles by age group, this section will provide an overview of exports and imports broken down by age groups. The table below illustrates the calculations for Germany.

Table 42: Calculation of exports in the case of Germany (M1)

Age group	2007 park	Model Scrap rate	Model scrapped cars	Model, New park	Observed new park	Export number of cars	Export % of cars
Age ≤ 1	2,809,519						
1 < Age ≤ 2	3,127,830	-0.8%	-21,175	2,788,344	2,784,811	3,533	0.1%
2 < Age ≤ 3	3,029,081	0.2%	7,028	3,134,858	3,142,821	-7,963	-0.3%
3 < Age ≤ 4	2,778,666	-1.5%	-45,872	2,983,209	2,808,781	174,428	5.8%
4 < Age ≤ 5	2,723,712	-0.2%	-5,674	2,772,992	2,688,363	84,629	3.0%
5 < Age ≤ 6	2,655,090	-0.2%	-5,841	2,717,871	2,640,585	77,286	2.8%
6 < Age ≤ 7	2,623,134	-0.1%	-3,790	2,651,300	2,551,277	100,023	3.8%
7 < Age ≤ 8	2,574,680	-0.4%	-11,618	2,611,516	2,502,955	108,561	4.1%
8 < Age ≤ 9	2,850,842	-1.0%	-26,557	2,548,123	2,451,001	97,122	3.8%
9 < Age ≤ 10	2,658,683	-2.1%	-59,009	2,791,833	2,696,757	95,076	3.3%
10 < Age ≤ 11	2,395,447	-3.3%	-86,536	2,572,147	2,502,347	69,800	2.6%
11 < Age ≤ 12	2,177,130	-5.0%	-119,858	2,275,589	2,223,056	52,533	2.2%
12 < Age ≤ 13	1,874,552	-6.9%	-150,209	2,026,921	2,003,920	23,001	1.1%
13 < Age ≤ 14	1,483,022	-9.7%	-182,201	1,692,351	1,666,868	25,483	1.4%
Age > 14	5,422,206	-15.6%	-1,074,513	5,830,715	5,891,896	-61,181	-4.1%

Age group "Age ≤ 1" contained 2 809 519 vehicles in 2007. For this age group, the scrap rate was 0.8% from 2007 to 2008. This means that, according to the model, 21 175 vehicles were scrapped from 2007 to 2008. Thus, the model predicts that age group "1 < Age ≤ 2" in 2008 contained 2 809 519 – 21 175 = 2 788 344 vehicles. However, as can be seen from the table, there were actually only 2 784 811 vehicles in age group 1 in 2008. The difference of 3 533 vehicles (0.1%) must be explained by exports, assuming the scrap rate is correct.

As can be seen there is a negative net export from Germany in the oldest age category. This might lead to the opinion that the scrapping rate may be overestimated for old vehicles in Germany.

Similar calculations for all countries create a picture of the import/export pattern in the EU.

The following figure shows import/export patterns according to age groups. To avoid too many details, age groups are arranged in four groups:

- Relatively new vehicles Age ≤ 4 years
- Mid age cars 4 < Age ≤ 9
- Older cars 9 < Age ≤ 13
- Old cars Age > 13 years

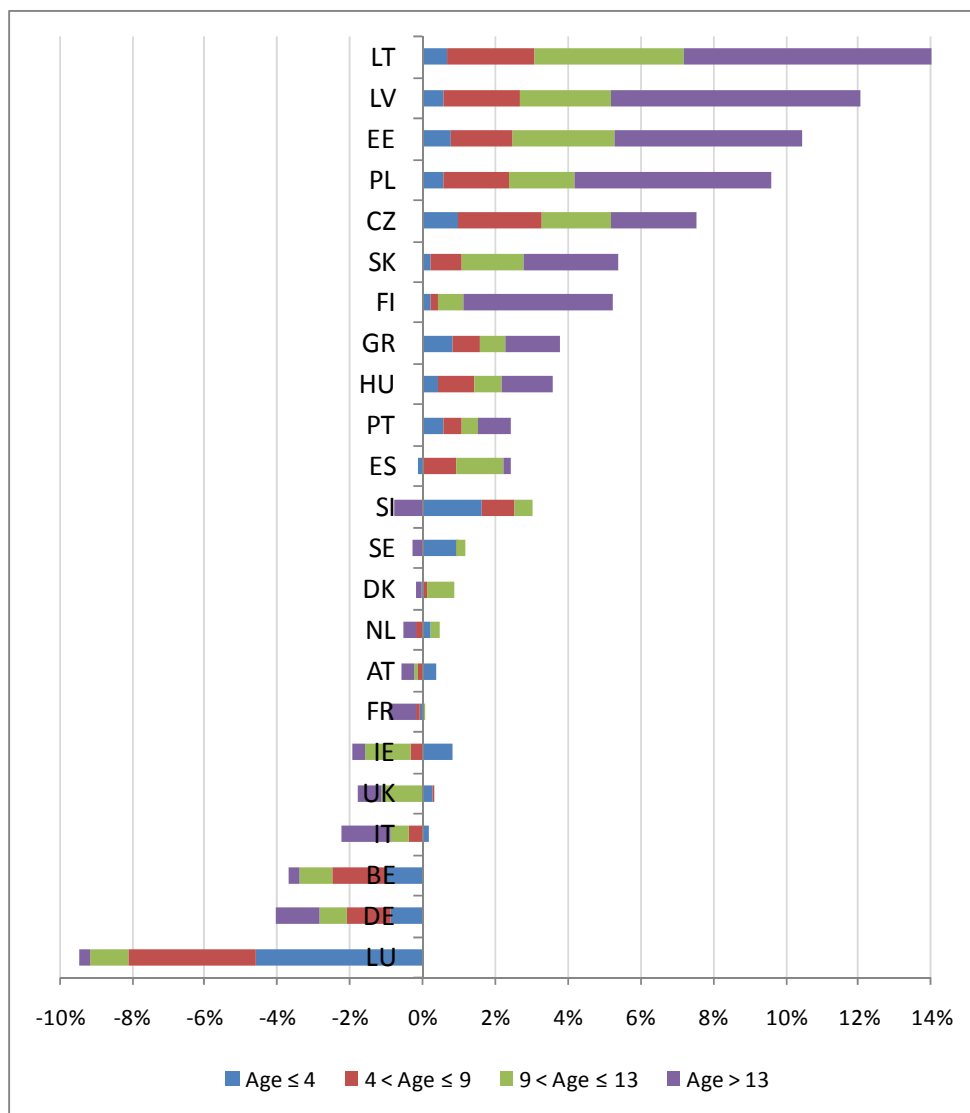


Figure 15: Net passenger cars imports (M1), average 2004 - 2009
Note: Export reported as negative figures, import reported as positive figures.

In the above figure, exports and imports are calculated as percentages of the car fleet. Therefore, the picture seems unbalanced. The figures below show imports and exports in absolute numbers.

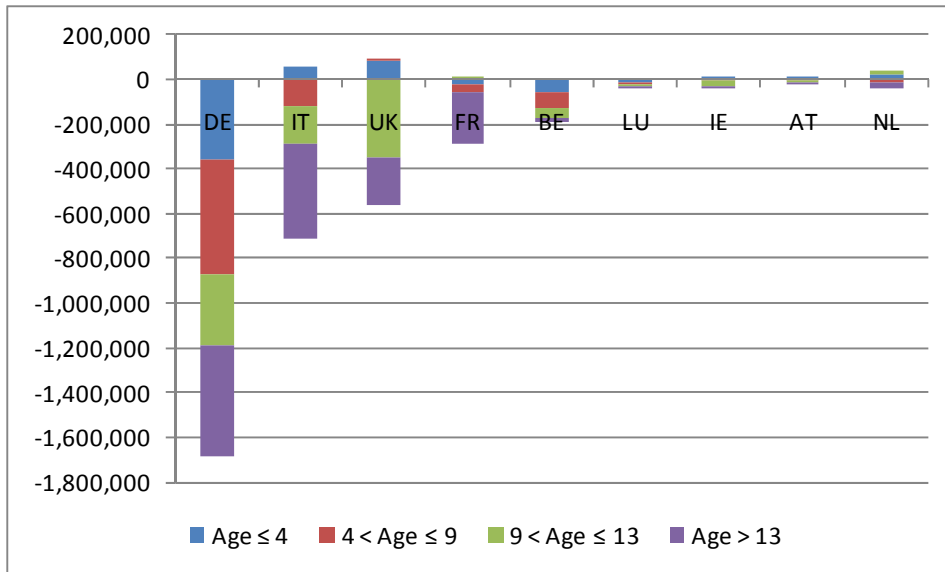


Figure 16: Net exporters of passenger cars (M1), average number of vehicles 2004 - 2009
Note: Export reported as negative figures, import reported as positive figures.

Germany alone stands for 47% of all export of second-hand vehicles. Italy and UK both account for 20% of all export of second-hand vehicles. However, the UK has a net import of second-hand vehicles of more recent date. Thus, import of young vehicles counterbalances some of the exports. Concerning old second-hand vehicles, four years and older, the UK share of export is 23%.

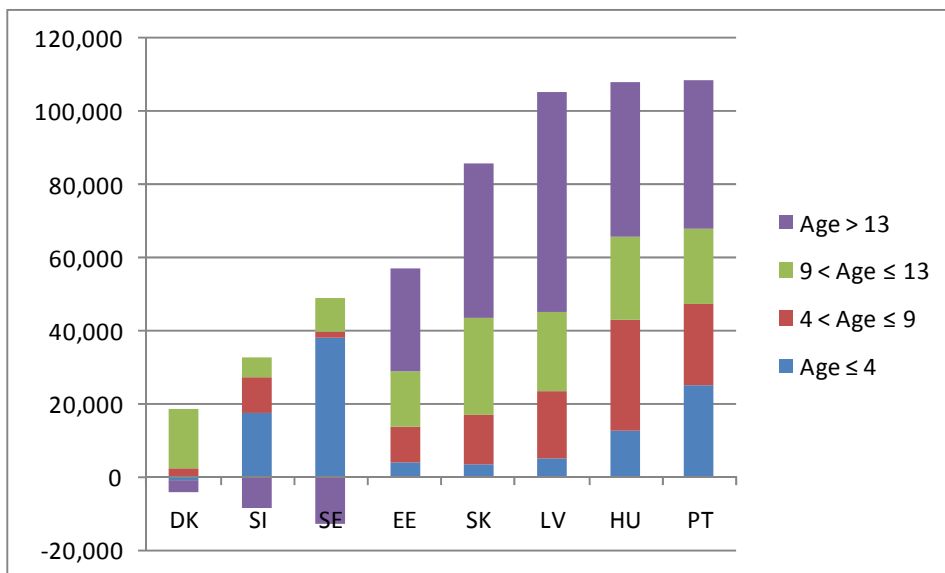


Figure 17: Net importers of passenger cars (M1), average number of vehicles 2004 - 2009
Note: Export reported as negative figures, import reported as positive figures.

Importing countries belong to different segments. Denmark imports a limited number of 9-13 year-old vehicles and at the same time, it exports a small number of old vehicles. Slovenia and Sweden import mainly vehicles of more recent date being up to four years old.

Estonia, Slovakia, Latvia, Hungary and Portugal all import significant numbers of old vehicles, including both 9-13 year-old and above 13 year-old vehicles.

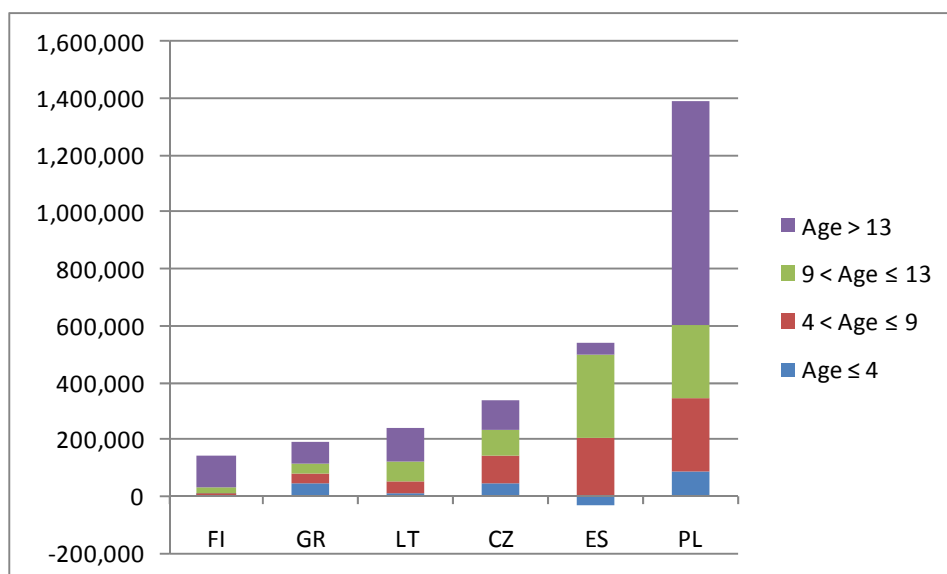


Figure 18: Large net importers of passenger cars (M1), average number of vehicles 2004 - 2009

The last figure shows second-hand car imports in countries importing above 120,000 vehicles annually. As can be seen, import of old cars to Spain and Poland is very high. Especially Poland is importing a large number of old vehicles above 13 year-old.

Although the exact magnitude scrap rates may be uncertain, the above figure does provide useful information about the import/export patterns in Europe.

A few clear conclusions can be drawn:

- Only a few countries have net exports: The main exporters are UK, Italy, France and particularly Germany. Germany accounts for approx. 50% of all exports of second-hand vehicles.
- A large number of countries import many medium-aged and old vehicles.
- Poland and Spain account for most import of old vehicles. Poland imports 54% of all vehicles above 13 years of age, while Spain imports 23% of all vehicles above 9 years of age.
- Conclusions are as expected: the less wealthy countries have higher import rates of medium-aged and old cars.
- Countries with the highest net imports also account for the highest share of imports concerning older vehicles.

2.3.4.3.3 New passenger car registrations

This section provides information about the share of new car registrations of the total vehicle fleet. The method chosen above assumes that net imports between the EU and the rest of the world are zero. It also assumes that the scrappage rates are similar across all countries. Finally, not all EU 27 countries are covered by the database, which is the basis for the calculations above. Thus, in order to validate the above findings and to give an indication of the situation in the four countries for which there are no data, this section presents the share of new car registrations of the total car fleet. In countries with large net imports, it is to be expected that imports would substitute new car registrations. As can be seen from the figure below, this is certainly the case.

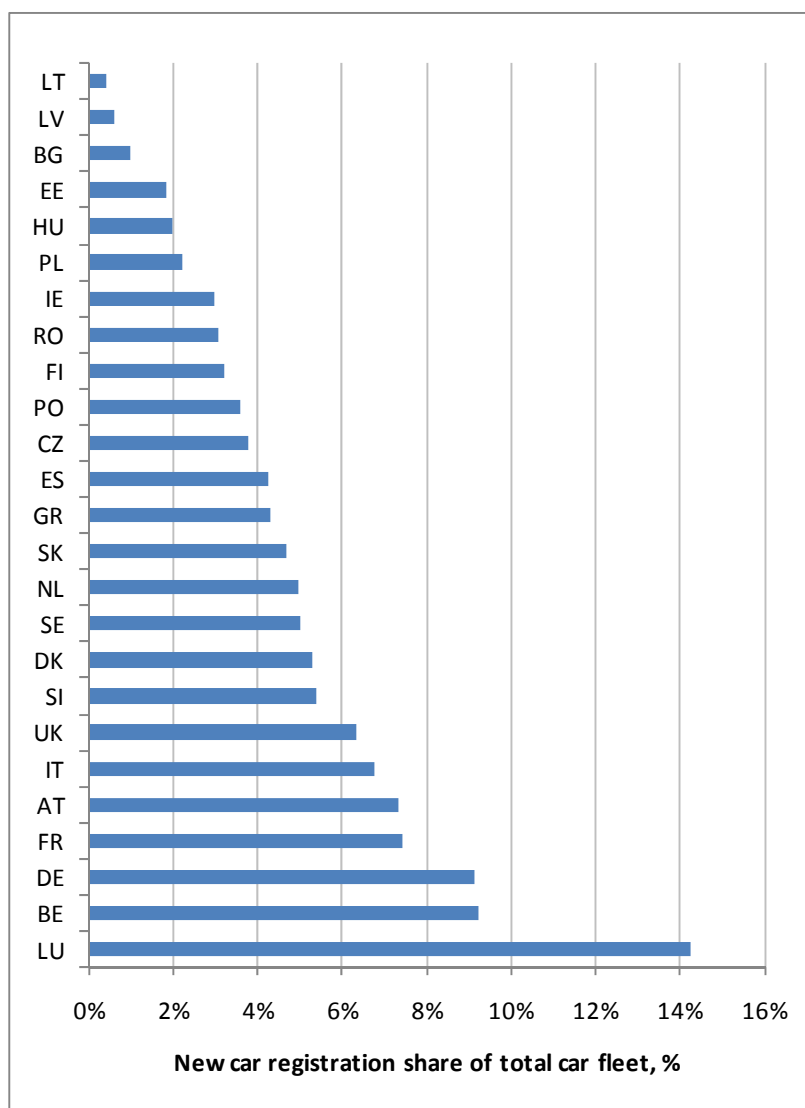


Figure 19: Share of new car registrations of total car fleet (M1), 2009 Source: New registrations: ACEA Statistics. Car fleet Bulgaria and Roumania: EUROSTAT. Car fleet remaining EU countries: POLK data.

According to Figure 15 in the previous section, the countries with the highest net import percentages concerning second-hand vehicles are Lithuania, Latvia, Estonia and Poland, in that order. These countries also have the lowest share of new car registrations. In these countries, purchase / import of old second-hand vehicles instead of new vehicles is widespread.

At the other end, the export percentages of Luxembourg, Germany, Belgium UK and Italy are high coinciding almost completely with the countries that have very high percentages of new car registrations.

Both of these findings support the findings of the sections above dealing with second-hand cars.

Furthermore, the share of new car registrations may give us an indication of the situation in the countries for which no data are available. Romania with approx 3% new car registrations lies in between the Czech Republic and Poland, which have a car production of their own.

Based on these statistics, one would expect that the situation of Romania is similar to those of Poland and the Czech Republic. However, one must be careful not to draw too rigid conclusions. Local differences in car taxation and import/export regulations and household income might alter the situation.

Similar argumentation would indicate that the situation in Bulgaria is similar to that of the three Baltic countries, Latvia, Lithuania and Estonia.

2.3.4.4 Light duty vehicles, N1

This subsection presents scrappage rates, imports and exports and gives illustrative examples of light duty vehicles.

2.3.4.4.1 Scrappage

The general idea in terms of light duty vehicles is the same as for passenger vehicles above. Thus, it is assumed that imports and exports will net out and that total exits from one age group to next year will be scrappage in this particular age group.

The table below shows the sum of all countries reported.

Table 43: Sum of light duty vehicles (N1), 2004-2009 by age group.

	2004	2005	2006	2007	2008	2009
Age ≤ 1	1,997,643	2,012,441	2,082,986	2,213,175	1,954,738	1,343,473
1 < Age ≤ 2	1,814,203	1,941,695	1,966,312	2,048,501	2,188,052	1,893,866
2 < Age ≤ 3	1,816,413	1,745,785	1,883,060	1,913,999	2,042,259	2,099,908
3 < Age ≤ 4	1,843,082	1,745,824	1,690,915	1,819,691	1,907,932	1,924,964
4 < Age ≤ 5	1,804,415	1,753,486	1,682,122	1,625,462	1,806,978	1,781,671
5 < Age ≤ 6	1,798,043	1,745,915	1,697,006	1,642,158	1,614,631	1,689,330
6 < Age ≤ 7	1,640,890	1,720,479	1,676,978	1,660,565	1,593,867	1,527,162
7 < Age ≤ 8	1,445,121	1,550,907	1,640,688	1,619,640	1,604,484	1,509,041
8 < Age ≤ 9	1,286,058	1,363,938	1,469,566	1,557,669	1,567,322	1,487,981
9 < Age ≤ 10	1,123,659	1,205,631	1,290,084	1,377,723	1,514,116	1,409,507
10 < Age ≤ 11	994,565	1,023,911	1,120,224	1,180,583	1,318,081	1,415,097
11 < Age ≤ 12	863,697	894,606	940,576	1,009,128	1,127,857	1,203,128
12 < Age ≤ 13	929,851	760,287	807,045	823,970	939,678	1,007,167
13 < Age ≤ 14	809,497	804,980	676,519	696,776	746,364	865,154
Age > 14	5,212,292	5,041,311	5,140,869	5,106,923	5,162,529	5,249,354
Total	25,379,429	25,311,196	25,764,950	26,295,963	27,088,888	26,406,803

Comparing one age group with the one year older age group in the following year gives us the scrappage from this age group. For instance, there were 2 213 175 vehicles in age group "Age ≤ 1" in 2007. In 2008, this age group is 1 year older ("1 < Age ≤ 2"), and now there are only 2 188 052 vehicles. This means that $2\,213\,175 - 2\,188\,052 = 25\,123$ vehicles, corresponding to 1.1%, left this age group from 2007 to 2008.

Assuming that all countries are included, imports and exports will net out, and the 1.1% will be the scrappage rate for this age group. The table below shows scrappage rates for all years calculated in a similar way.

Table 44: Scrapage rates for EU 2005-2009 (N1)

Age	2005	2006	2007	2008	2009	Average
Age ≤ 1	-2.8%	-2.3%	-1.7%	-1.1%	-3.1%	-2.2%
1 < Age ≤ 2	-3.8%	-3.0%	-2.7%	-0.3%	-4.0%	-2.8%
2 < Age ≤ 3	-3.9%	-3.1%	-3.4%	-0.3%	-5.7%	-3.3%
3 < Age ≤ 4	-4.9%	-3.6%	-3.9%	-0.7%	-6.6%	-3.9%
4 < Age ≤ 5	-3.2%	-3.2%	-2.4%	-0.7%	-6.5%	-3.2%
5 < Age ≤ 6	-4.3%	-3.9%	-2.1%	-2.9%	-5.4%	-3.8%
6 < Age ≤ 7	-5.5%	-4.6%	-3.4%	-3.4%	-5.3%	-4.4%
7 < Age ≤ 8	-5.6%	-5.2%	-5.1%	-3.2%	-7.3%	-5.3%
8 < Age ≤ 9	-6.3%	-5.4%	-6.2%	-2.8%	-10.1%	-6.2%
9 < Age ≤ 10	-8.9%	-7.1%	-8.5%	-4.3%	-6.5%	-7.1%
10 < Age ≤ 11	-10.1%	-8.1%	-9.9%	-4.5%	-8.7%	-8.3%
11 < Age ≤ 12	-12.0%	-9.8%	-12.4%	-6.9%	-10.7%	-10.3%
12 < Age ≤ 13	-13.4%	-11.0%	-13.7%	-9.4%	-7.9%	-11.1%
Age > 13	-16.3%	-12.1%	-12.2%	-11.0%	-11.2%	-12.6%

The scrappage rates seems a little high, especially for the younger age groups. One reason for this could be that these exit rates may include some exports to other countries. Another possibility is that some light duty vehicles change status from light duty vehicles to passenger cars when they are exported. If this is the case it might be more appropriate to see passenger cars and light duty vehicles together.

Since there are fluctuations from year to year, it is expected that the average for several years will give a more reliable estimate of scrappage rates.

The figure below shows the average scrappage rates for light duty vehicles.

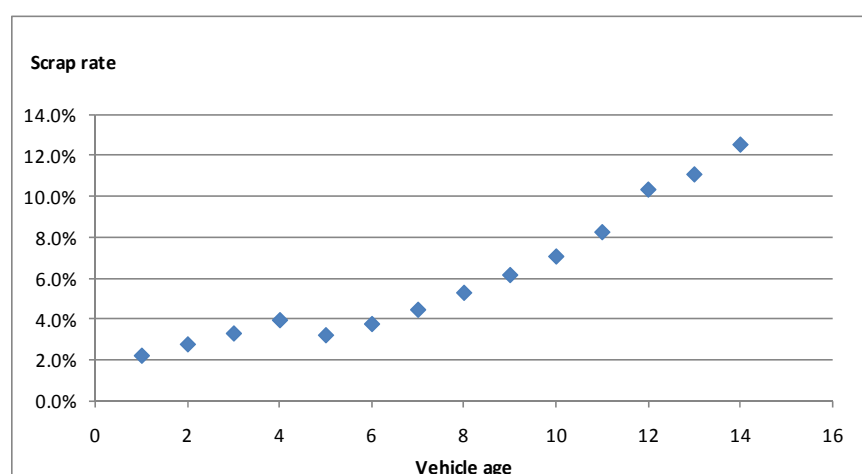


Figure 20: Average scrappage rates for EU 2005-2009 (N1)

As can be seen from the figure, total scrappage is 2% - 4% in the first 6 years. These scrappage rates seem to be too high. One would expect the scrappage rate to be very low, probably below 1% at least up to six to eight years. Thus, the total scrappage rate indicates a substantial export of almost new light duty vehicles out of EU 27, or more precisely out of the

23 EU countries covered by the POLK data source.

After six years, the scrappage rate begins to increase due to aging of vehicles. For the oldest age group, there is a scrappage rate of 12%.

Although there may be indications that the model disregards some exports out of the EU, it still gives a good picture of the intra-EU import/export patterns.

2.3.4.4.2 Imports and exports

Assuming that the above scrapping rates give a reasonable picture of the scrappage of vehicles by age group, and disregarding net exports out of the EU; this section presents exports and imports broken down by age groups. The table below illustrates the calculations in the case of Germany.

Table 45: Calculation of exports for Germany (N1)

Age group	2007 park	Model Scrap rate	Model scrapped cars	Model, New park	Observed new park	Export number of cars	Export % of cars
Age ≤ 1	209,877						
1 < Age ≤ 2	179,654	-1.1%	-2,382	207,495	199,565	7,930	3.8%
2 < Age ≤ 3	157,785	-0.3%	-547	179,107	173,049	6,058	3.4%
3 < Age ≤ 4	138,003	-0.3%	-500	157,285	142,645	14,640	9.3%
4 < Age ≤ 5	120,953	-0.7%	-964	137,039	123,349	13,690	9.9%
5 < Age ≤ 6	113,552	-0.7%	-806	120,147	109,813	10,334	8.5%
6 < Age ≤ 7	113,674	-2.9%	-3,339	110,213	103,856	6,357	5.6%
7 < Age ≤ 8	109,275	-3.4%	-3,839	109,835	104,928	4,907	4.3%
8 < Age ≤ 9	107,090	-3.2%	-3,530	105,745	99,540	6,205	5.7%
9 < Age ≤ 10	92,299	-2.8%	-2,994	104,096	97,164	6,932	6.5%
10 < Age ≤ 11	79,750	-4.3%	-3,996	88,303	82,282	6,021	6.5%
11 < Age ≤ 12	67,958	-4.5%	-3,562	76,188	71,605	4,583	5.7%
12 < Age ≤ 13	58,143	-6.9%	-4,677	63,281	58,951	4,330	6.4%
13 < Age ≤ 14	52,890	-9.4%	-5,476	52,667	50,668	1,999	3.4%
Age > 14	258,822	-11.0%	-34,437	277,275	266,623	10,652	20.1%

Age group "Age ≤ 1" contains 209 877 vehicles in 2007. For this age group, the scrap rate was 1.1% on average. That means that between 2007 and 2008, 2 382 vehicles were scrapped. Thus the model predicts that age group "1 < Age ≤ 2" in 2008 would contain 209 877 – 2 382 = 207 495 vehicles. However, as can be seen from the table, there were only 199 565 vehicles in age group "1 < Age ≤ 2" in 2008. The difference of 7 930, or 3.8% must have been exported (assuming the scrap rate is correct and disregarding extra-EU exports). By making similar calculations for all countries, a picture of the import/export pattern based on the available data is established.

The following figure shows import/export patterns by age groups. In order to limit the degree of detail, the age groups are arranged in four groups:

- Relatively new vehicles Age ≤ 4 years
- Mid age cars 4 < Age ≤ 9
- Older cars 9 < Age ≤ 13
- Old cars Age > 13 years

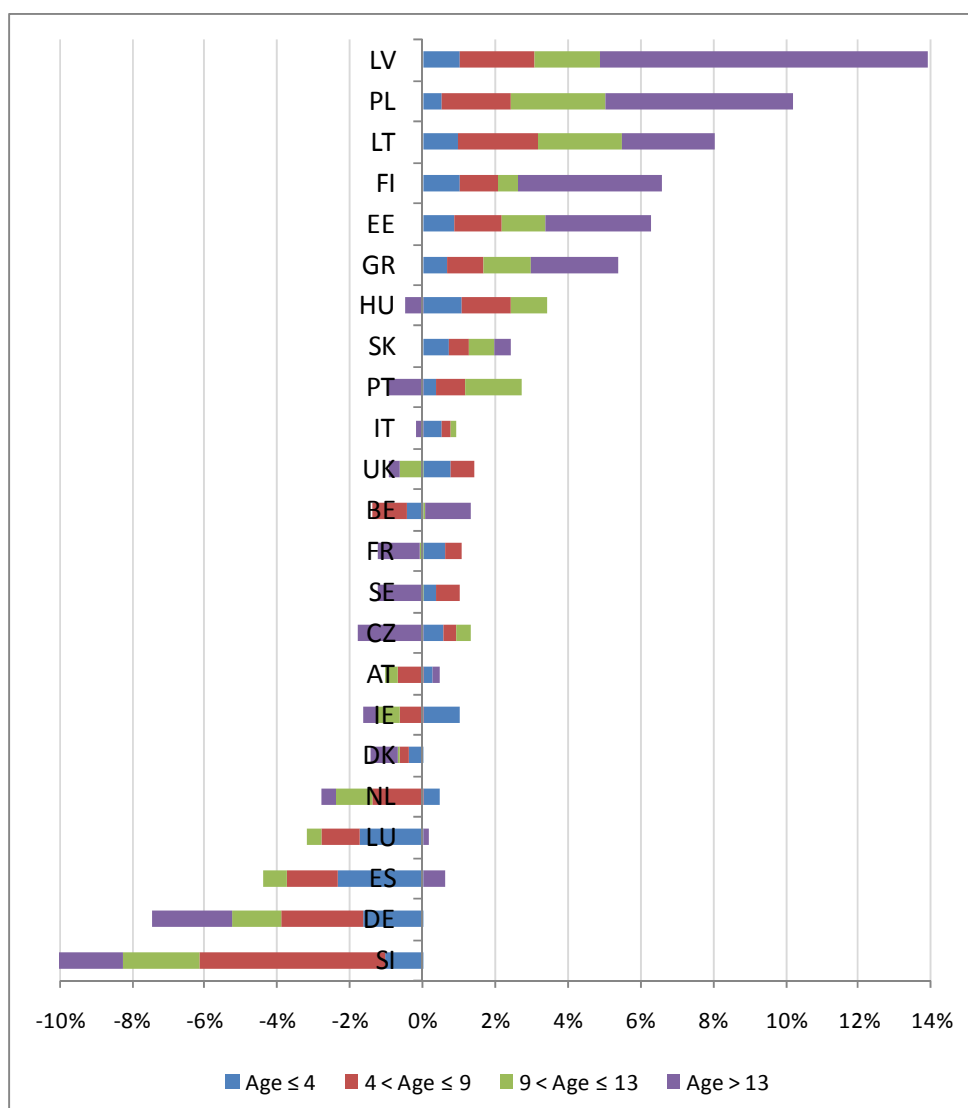


Figure 21: Net imports of light duty vehicles (N1), average 2004 - 2009
Note: Export reported as negative figures, import reported as positive figures.

Exports and imports in the above figure are calculated as percentages of the car fleet. Therefore, the picture seems unbalanced. The figures below show imports and exports in absolute numbers.

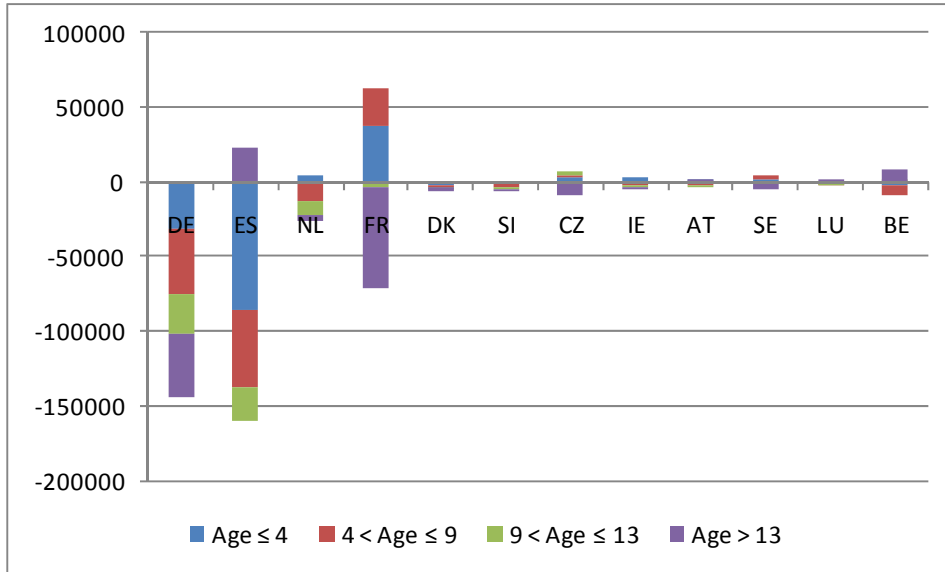


Figure 22: Net exporters of light duty vehicles (N1), average number of vehicles 2004 - 2009
Note: Export reported as negative figures, import reported as positive figures.

Germany alone exports 150,000 light duty vehicles annually, or 44% of all exports of second hand light duty vehicles. Spain accounts for 41% of all exports of second-hand light duty vehicles. France accounts for 3% of all light duty vehicles exports. However, France has a net import of second-hand vehicles of more recent date. Looking at old second hand vehicles, older than 13 years, the French exports amounts to 41% of total exports of old light duty vehicles.

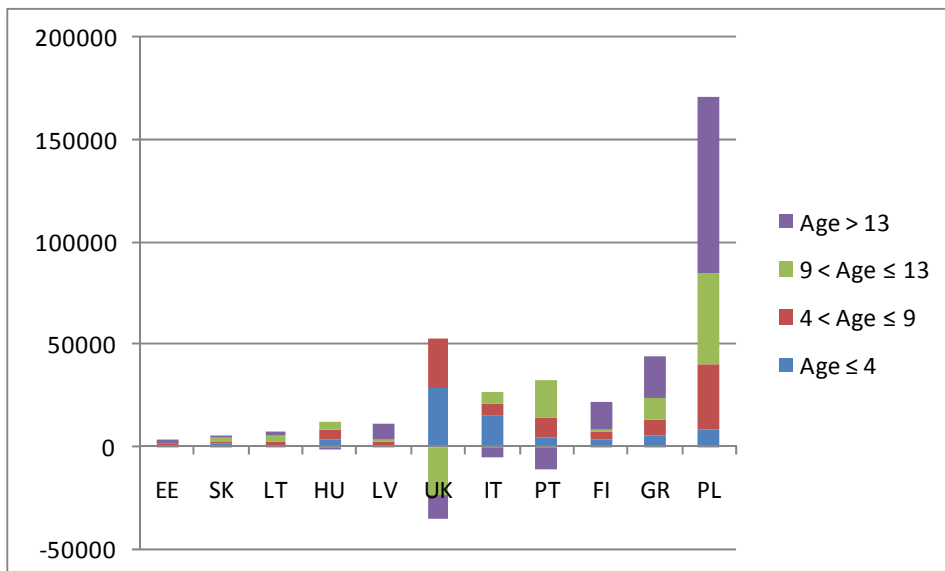


Figure 23: Net importers of light duty vehicles (N1), average number of vehicles 2004 - 2009
Note: Export reported as negative figures, import reported as positive figures.

Poland is the largest importer of second-hand light duty vehicles. Poland alone is importing 51% of all second-hand light duty vehicles. The share of old vehicles is even higher. UK, Italy, Portugal and Finland are importing 5% to 6% of all second-hand light duty vehicles each. Greece is importing 13% of all second-hand light duty vehicles.

Although the exact magnitude of scrap rates may be uncertain, the above figure does

provide useful information of the import/export pattern in Europe.

A few clear conclusions can be drawn:

- Only a few countries have net exports: Main exports come from Spain, France and in particular Germany that accounts for approx. 50% of all exports of second-hand light duty vehicles. This pattern is somewhat similar to the pattern for passenger cars.
- Only a limited number of countries import substantial amounts of old vehicles. This is contrary to the passenger car situation where a large number of countries import many medium-aged and old vehicles.
- Poland imports most of old vehicles imported. Poland imports 50% of all old vehicles imported, while Greece imports 13% of all old vehicles.

2.3.4.5 Passenger cars and light duty vehicles, M1 + N1

This subsection presents scrappage rates, imports/exports and illustrative examples of passenger car and light duty vehicles all together.

Some countries apply the distinction between M1 and N1 different and this may lead to misleading interpretation. To eliminate this source of error, this section looks at the total number of passenger cars and light duty vehicles.

2.3.4.5.1 Scrappage

The general idea of the model is that by aggregating all relevant countries, imports and exports will net out, and total exits in one age group from one year to the next year will be scrappage. The table below shows the sum of all countries reported.

Table 46: Sum of vehicles (M1+N1), 2004-2009 by age group.

	2004	2005	2006	2007	2008	2009
Age ≤ 1	16,904,617	16,823,323	17,032,676	16,911,659	15,513,113	15,064,772
1 < Age ≤ 2	16,431,329	16,810,376	16,755,368	16,631,520	16,775,757	15,484,302
2 < Age ≤ 3	16,423,504	16,275,301	16,681,887	16,407,995	16,658,047	16,859,527
3 < Age ≤ 4	16,643,236	16,261,997	16,158,455	16,237,911	16,182,433	16,481,700
4 < Age ≤ 5	16,562,425	16,486,383	16,128,125	15,785,926	16,195,757	16,132,438
5 < Age ≤ 6	16,870,237	16,442,782	16,331,672	15,781,293	15,744,729	16,129,512
6 < Age ≤ 7	15,674,298	16,712,672	16,302,487	15,957,742	15,712,818	15,671,596
7 < Age ≤ 8	14,400,765	15,437,537	16,534,725	15,860,562	15,838,339	15,542,224
8 < Age ≤ 9	13,229,573	14,090,218	15,160,958	15,952,001	15,661,353	15,496,583
9 < Age ≤ 10	12,124,442	12,787,300	13,677,880	14,394,581	15,610,503	15,049,876
10 < Age ≤ 11	11,147,921	11,530,175	12,220,113	12,756,216	13,911,259	14,905,477
11 < Age ≤ 12	9,701,498	10,393,909	10,823,672	11,104,202	12,124,296	12,945,262
12 < Age ≤ 13	10,336,075	8,807,656	9,544,120	9,549,141	10,338,252	10,930,305
13 < Age ≤ 14	9,152,847	9,123,043	7,874,446	8,095,204	8,623,472	9,072,223
Age > 14	40,832,324	42,386,223	44,472,747	43,336,489	43,690,412	45,248,960
Total	236,435,091	240,368,895	245,699,331	244,762,442	248,580,540	251,014,757

Comparing one age group with the one-year-older age group in the next year provides the scrappage figure from this age group. For instance, there were 16 911 659 vehicles in age group "Age ≤ 1" in 2007. In 2008, this age group is one year older ("1 < Age ≤ 2"), and now

there are only 16 775 757 vehicles. This means that $16\,911\,659 - 16\,775\,757 = 135\,902$ vehicles corresponding to 0.8% left this age group from 2007 to 2008.

Assuming that all countries are included, imports and exports will net out, and the 0.8% will be the scrappage rate for this age group. However, as explained above, some countries are left out of the model, and since the scrappage rate may be a little too high for this age group, it indicates that exits may also include some exports to other countries.

The table below shows the scrappage rates for all years calculated according to this methodology.

Table 47: Scrappage rates for EU (M1+N1), 2005-2009.

Age	2005	2006	2007	2008	2009	Average
Age ≤ 1	-0.6%	-0.4%	-2.4%	-0.8%	-0.2%	-0.9%
1 < Age ≤ 2	-0.9%	-0.8%	-2.1%	0.2%	0.5%	-0.6%
2 < Age ≤ 3	-1.0%	-0.7%	-2.7%	-1.4%	-1.1%	-1.4%
3 < Age ≤ 4	-0.9%	-0.8%	-2.3%	-0.3%	-0.3%	-0.9%
4 < Age ≤ 5	-0.7%	-0.9%	-2.2%	-0.3%	-0.4%	-0.9%
5 < Age ≤ 6	-0.9%	-0.9%	-2.3%	-0.4%	-0.5%	-1.0%
6 < Age ≤ 7	-1.5%	-1.1%	-2.7%	-0.7%	-1.1%	-1.4%
7 < Age ≤ 8	-2.2%	-1.8%	-3.5%	-1.3%	-2.2%	-2.2%
8 < Age ≤ 9	-3.3%	-2.9%	-5.1%	-2.1%	-3.9%	-3.5%
9 < Age ≤ 10	-4.9%	-4.4%	-6.7%	-3.4%	-4.5%	-4.8%
10 < Age ≤ 11	-6.8%	-6.1%	-9.1%	-5.0%	-6.9%	-6.8%
11 < Age ≤ 12	-9.2%	-8.2%	-11.8%	-6.9%	-9.8%	-9.2%
12 < Age ≤ 13	-11.7%	-10.6%	-15.2%	-9.7%	-12.2%	-11.9%
Age > 13	-15.2%	-13.7%	-17.2%	-15.1%	-13.5%	-14.9%

Since there are fluctuations from year to year, it is expected that calculating the average over several years will give a more reliable estimate of the scrappage rates.

The figure below shows the average scrappage rates.

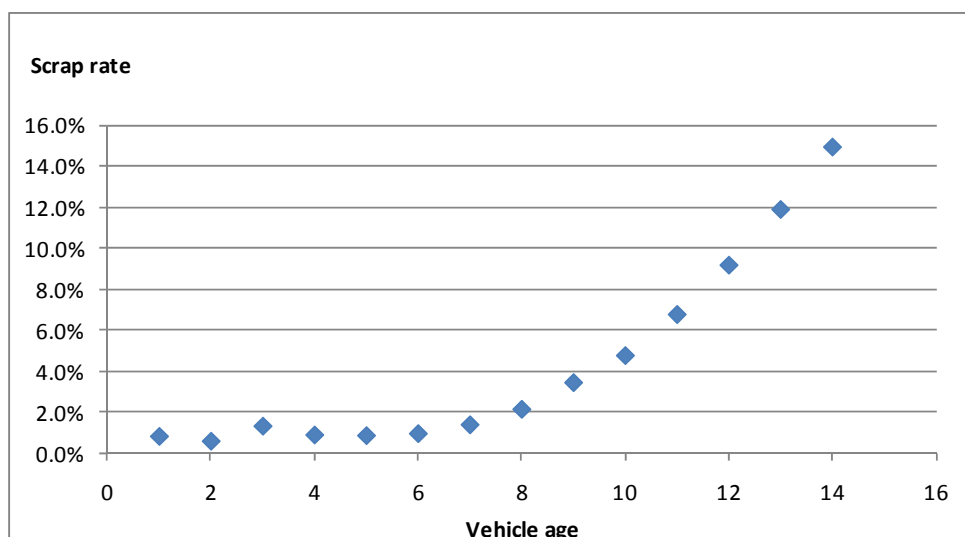


Figure 24: Average scrappage rates for EU, (M1+N1) 2005-2009.

Although we did not include all countries due to lack of data, these scrappage rates look acceptable. It seems reasonable that scrappage in the first years is low. After eight years, the scrappage rate begins to increase due to aging of vehicles. For the oldest age group, there is a considerably higher scrappage rate compared with previous years.

2.3.4.5.2 Imports and exports

Assuming the above scrapping rates gives a reasonable picture of the scrapping of vehicles by age group, this section will provide an overview of exports and imports broken down by age groups. The table below illustrates the calculations for Germany.

Table 48: Calculation of exports in the case of Germany (M1+N1)

Age group	2007 park	Model Scrap rate	Model scrapped cars	Model, New park	Observed new park	Export number of cars	Export % of cars
Age ≤ 1	3,019,396						
1 < Age ≤ 2	3,307,484	-0.8%	-24,264	2,995,132	2,984,376	10,756	0.4%
2 < Age ≤ 3	3,186,866	0.2%	5,275	3,312,759	3,315,870	-3,111	-0.1%
3 < Age ≤ 4	2,916,669	-1.4%	-43,810	3,143,056	2,951,426	191,630	6.0%
4 < Age ≤ 5	2,844,665	-0.3%	-7,572	2,909,097	2,811,712	97,385	3.3%
5 < Age ≤ 6	2,768,642	-0.3%	-7,424	2,837,241	2,750,398	86,843	3.1%
6 < Age ≤ 7	2,736,808	-0.4%	-12,013	2,756,629	2,655,133	101,496	3.7%
7 < Age ≤ 8	2,683,955	-0.7%	-20,478	2,716,330	2,607,883	108,447	4.0%
8 < Age ≤ 9	2,957,932	-1.3%	-33,711	2,650,244	2,550,541	99,703	3.7%
9 < Age ≤ 10	2,750,982	-2.1%	-63,323	2,894,609	2,793,921	100,688	3.4%
10 < Age ≤ 11	2,475,197	-3.4%	-92,369	2,658,613	2,584,629	73,984	2.7%
11 < Age ≤ 12	2,245,088	-5.0%	-122,617	2,352,580	2,294,661	57,919	2.3%
12 < Age ≤ 13	1,932,695	-6.9%	-154,863	2,090,225	2,062,871	27,354	1.2%
13 < Age ≤ 14	1,535,912	-9.7%	-187,350	1,745,345	1,717,536	27,809	1.4%
Age > 14	5,681,028	-15.1%	-1,086,263	6,130,677	6,158,519	-27,842	-1.8%

Age group "Age ≤ 1" contained 3 019 396 vehicles in 2007. For this age group, the scrap rate was 0.8% in 2007/2008. This means that, according to the model, 24 264 vehicles were scrapped from 2007 to 2008. Thus, the model predicts that age group "1 < Age ≤ 2" in 2008 contained 3 019 396 – 24 264 = 2 995 132 vehicles. However, as can be seen from the table, there were actually only 2 984 376 vehicles in age group "1 < Age ≤ 2" in 2008. The difference of 10 756 vehicles (0.4%) must be explained by exports, assuming the scrap rate is correct. Similar calculations for all countries create a picture of the import/export pattern in the EU.

The following figure shows import/export patterns according to age groups. To avoid too many details, age groups are arranged in four groups:

- Relatively new vehicles Age ≤ 4 years
- Mid age cars 4 < Age ≤ 9
- Older cars 9 < Age ≤ 13
- Old cars Age > 13 years

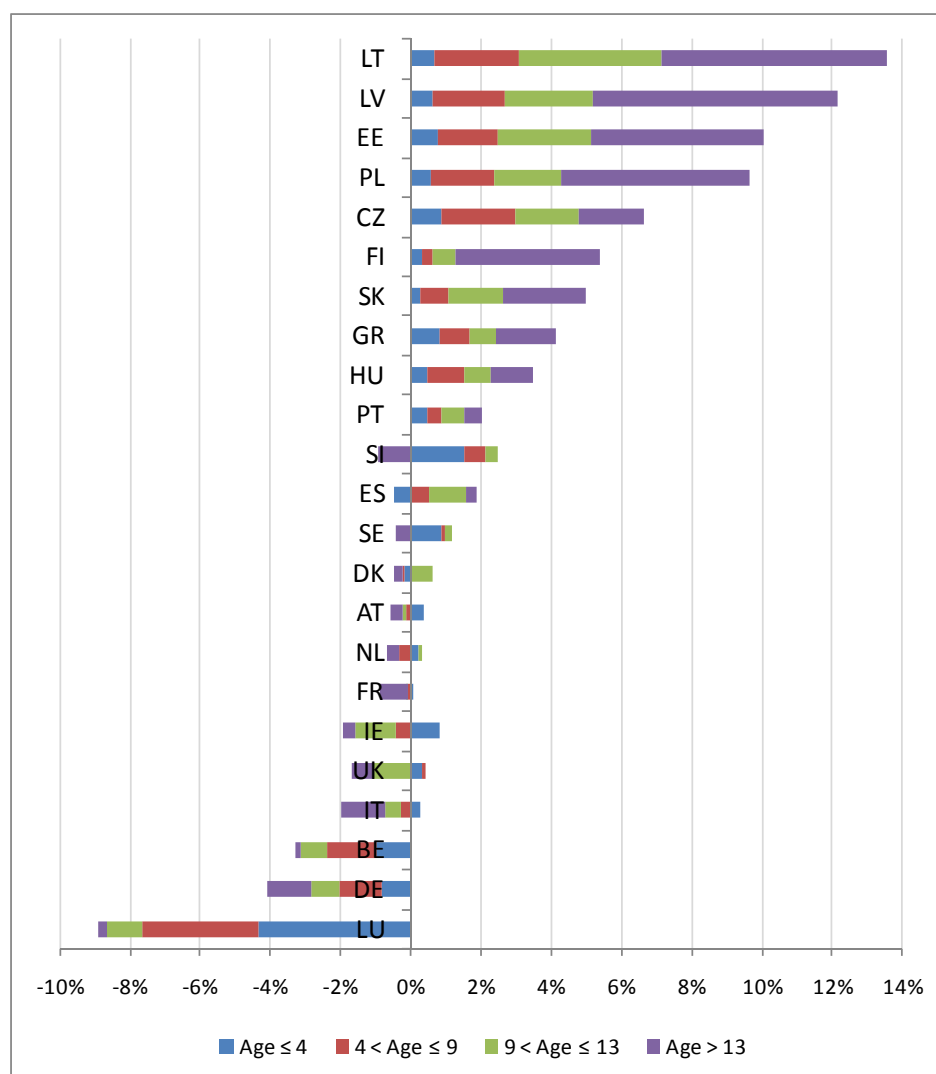


Figure 25: Net vehicle imports (M1+N1), average 2004 - 2009
Note: Export reported as negative figures, import reported as positive figures.

In the above figure, exports and imports are calculated as percentages of the car fleet. Therefore, the picture seems unbalanced. The figures below show imports and exports in absolute numbers.

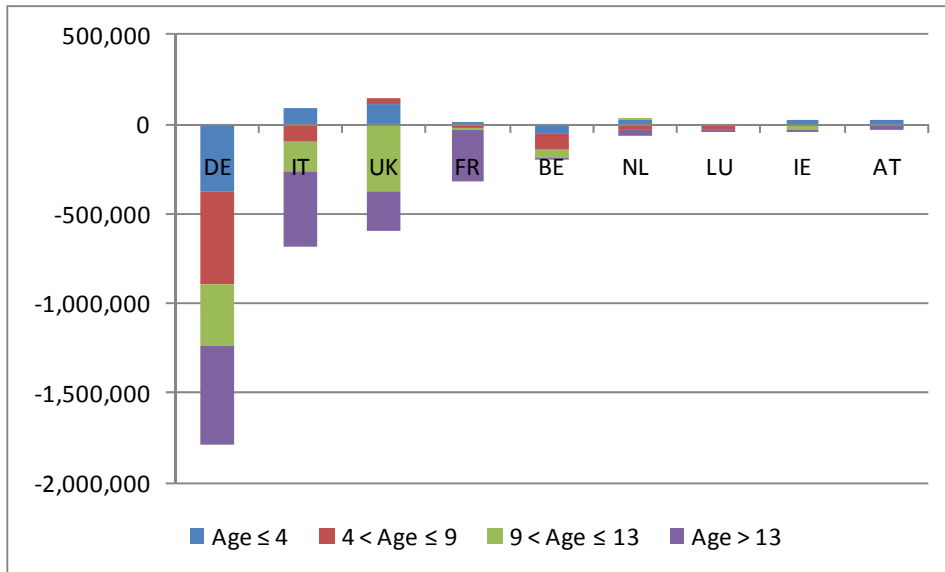


Figure 26: Net exporters of vehicles (M1+N1), average number of vehicles 2004 - 2009
Note: Export reported as negative figures, import reported as positive figures.

Germany alone stands for 52% of all export of second-hand passenger car vehicles. Italy and UK account for 17% and 13% of all export of second-hand vehicles.

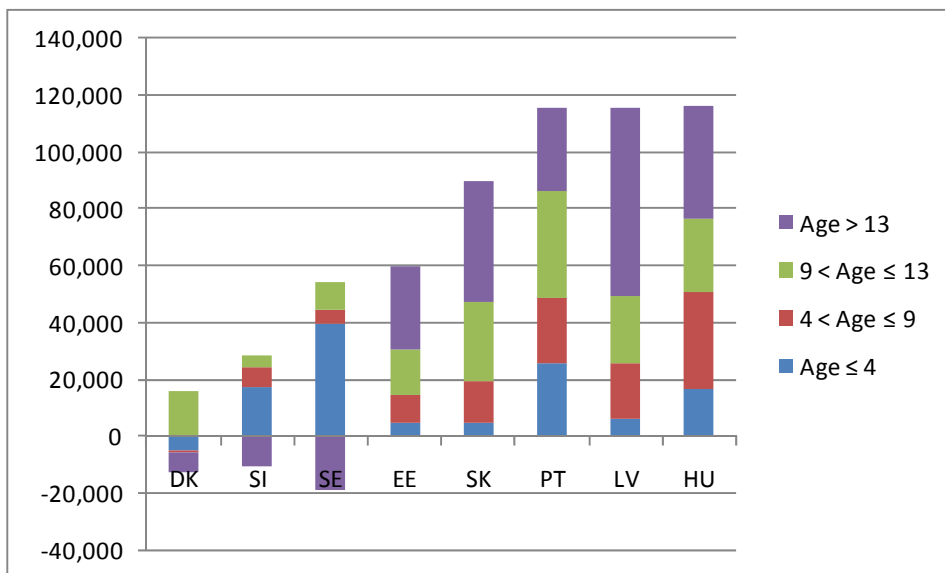


Figure 27: Net importers of vehicles (M1+N1), average number of vehicles 2004 - 2009
Note: Export reported as negative figures, import reported as positive figures.

Importing countries belong to different segments. Denmark imports a limited number of 9-13 year-old vehicles and at the same time, it exports a small number of old vehicles. Slovenia and Sweden import mainly vehicles of more recent date being up to four years old.

Estonia, Slovakia, Latvia, Hungary and Portugal all import significant numbers of old

vehicles, including both 9-13 years and above 13 year-old vehicles.

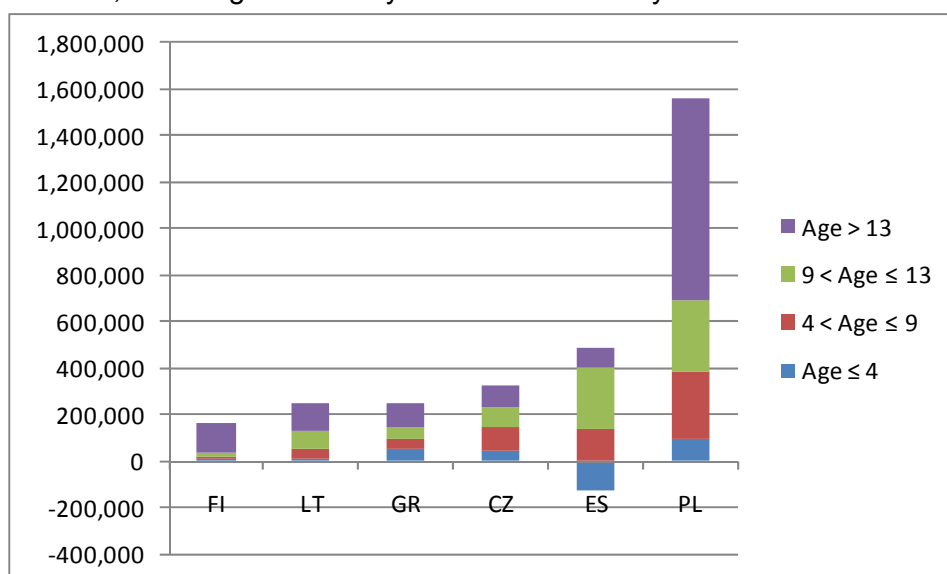


Figure 28: Large net importers of vehicles (M1+N1), average number of vehicles 2004 - 2009
Note: Export reported as negative figures, import reported as positive figures.

The last figure shows second-hand car imports in countries importing above 120,000 vehicles annually. As can be seen, import of old cars to Spain and Poland is very high. Especially Poland is importing a large number of old vehicles above 13 years-old.

Although the exact magnitude scrap rates may be uncertain, the above figure does provide useful information about the import/export patterns in Europe.

A few clear conclusions can be drawn:

- Only a few countries have net exports: the UK, Italy, France and particularly Germany that accounts for approx. 52% of all exports of second-hand vehicles.
- A large number of countries import many medium-aged and old vehicles.
- Poland and Spain account for most import of old vehicles. Poland imports 54% of all vehicles above 13 years of age, while Spain imports 27% of all vehicles 9 - 13 years of age.
- Conclusions are as expected: the less wealthy countries have higher import rates of medium-aged and old cars.

2.3.4.6 Adjustment for additional exports, M1 + N1

Romania, Bulgaria and extra EU countries are not included in the POLK database and therefore not included in the above calculations. Based on additional data sources as described in previous chapters of this section 2, the net exports to these countries is estimated to be at least 150 000 vehicles to Bulgaria, at least 180 000 vehicles to Romania and at least 720 000 vehicles to countries outside EU (all M1+N1). Adjusting for these exports would reduce the scrappage rates and increase export from EU countries.

This subsection presents scrappage rates and imports/exports adjusted for exports to Romania and Bulgaria and extra EU countries. In order to make the adjustment, it has been assumed that the age structure of vehicle imports to Bulgaria is similar to the age structure of imports to the Baltic States and that the age structure of the import to Romania is similar to

the age structure of import to Poland. Regarding import to extra EU countries it has been assumed that the age structure of exports to extra EU countries is similar to the average age structure of exports to Poland and the Baltic States.

2.3.4.6.1 Scrappage

The general idea of the model is that by aggregating all relevant countries, imports and exports will net out, and total exits in one age group from one year to the next year will be scrappage. The table below shows the scrappage rates for all years calculated according to this methodology and adjusted for export to Bulgaria, Romania and extra EU countries.

Table 49: Scrappage rates for EU (M1+N1), 2005-2009.

Age	2005	2006	2007	2008	2009	Adjusted
Age ≤ 1	-0.5%	-0.4%	-2.3%	-0.8%	-0.1%	-0.8%
1 < Age ≤ 2	-0.9%	-0.7%	-2.0%	0.2%	0.6%	-0.5%
2 < Age ≤ 3	-0.9%	-0.6%	-2.6%	-1.3%	-1.0%	-1.3%
3 < Age ≤ 4	-0.8%	-0.7%	-2.2%	-0.1%	-0.2%	-0.8%
4 < Age ≤ 5	-0.6%	-0.8%	-2.0%	-0.1%	-0.2%	-0.7%
5 < Age ≤ 6	-0.7%	-0.7%	-2.1%	-0.2%	-0.3%	-0.8%
6 < Age ≤ 7	-1.3%	-0.8%	-2.5%	-0.5%	-0.8%	-1.2%
7 < Age ≤ 8	-1.9%	-1.5%	-3.3%	-1.0%	-1.9%	-1.9%
8 < Age ≤ 9	-3.0%	-2.6%	-4.8%	-1.8%	-3.6%	-3.2%
9 < Age ≤ 10	-4.5%	-4.0%	-6.4%	-3.0%	-4.2%	-4.4%
10 < Age ≤ 11	-6.3%	-5.7%	-8.7%	-4.5%	-6.6%	-6.3%
11 < Age ≤ 12	-8.7%	-7.7%	-11.3%	-6.4%	-9.4%	-8.7%
12 < Age ≤ 13	-11.2%	-10.0%	-14.7%	-9.1%	-11.8%	-11.4%
Age > 13	-14.2%	-12.7%	-16.3%	-14.1%	-12.6%	-14.0%

The figure below shows the average scrappage rates with and without adjustment for additional exports.

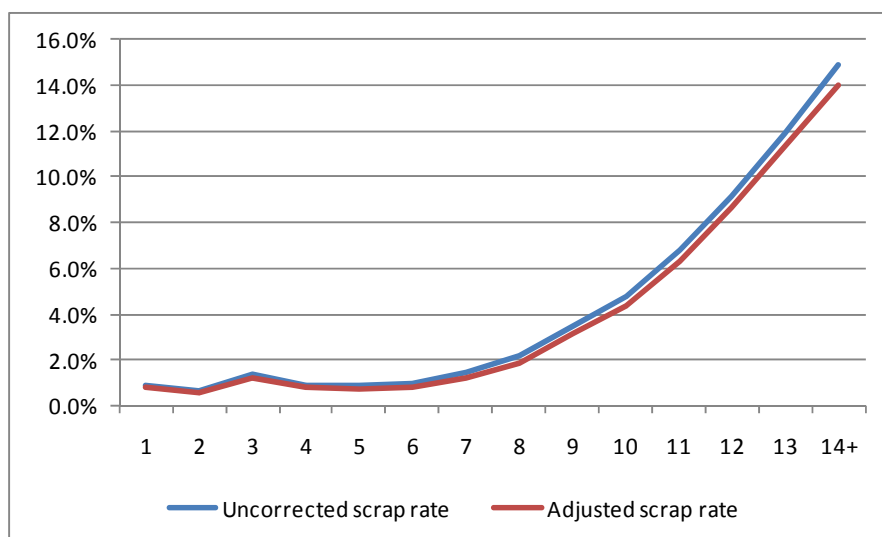


Figure 29: Average scrappage rates for EU, (M1+N1) 2005-2009.

As can be seen, the adjustment of the scrappage rate results in a little smaller scrappage rates compared with the unadjusted scrappage rate in the previous section. However, the impact seems small.

2.3.4.6.2 Imports and exports

Assuming the above scrapping rates gives a reasonable picture of the scrapping of vehicles by age group, this section will provide an overview of exports and imports broken down by age groups.

The following figure shows import/export patterns according to age groups. To avoid too many details, age groups are arranged in four groups:

- Relatively new vehicles Age \leq 4 years
- Mid age cars 4 < Age \leq 9
- Older cars 9 < Age \leq 13
- Old cars Age > 13 years

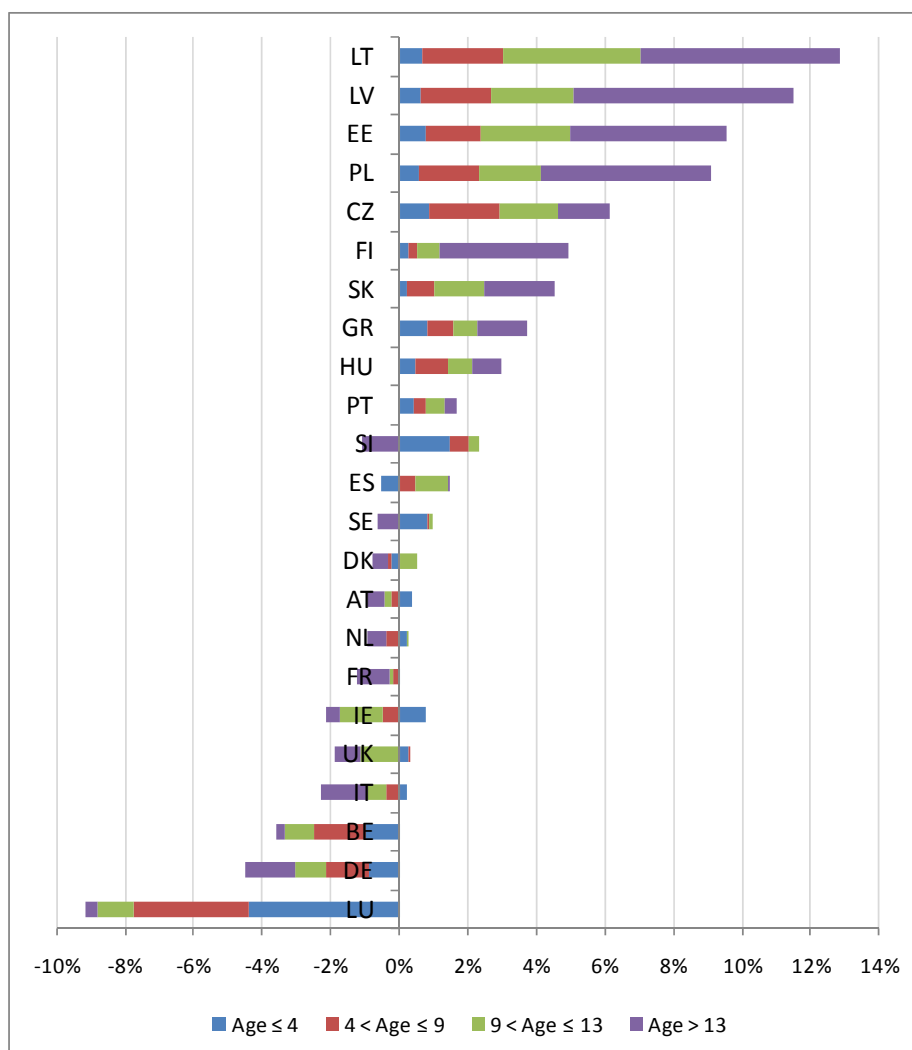


Figure 30: Net vehicle imports (M1+N1), average 2004 - 2009
Note: Export reported as negative figures, import reported as positive figures; adjusted for additional export.

In the above figure, exports and imports are calculated as percentages of the car fleet. Therefore, the picture seems unbalanced. The figures below show imports and exports in absolute numbers.

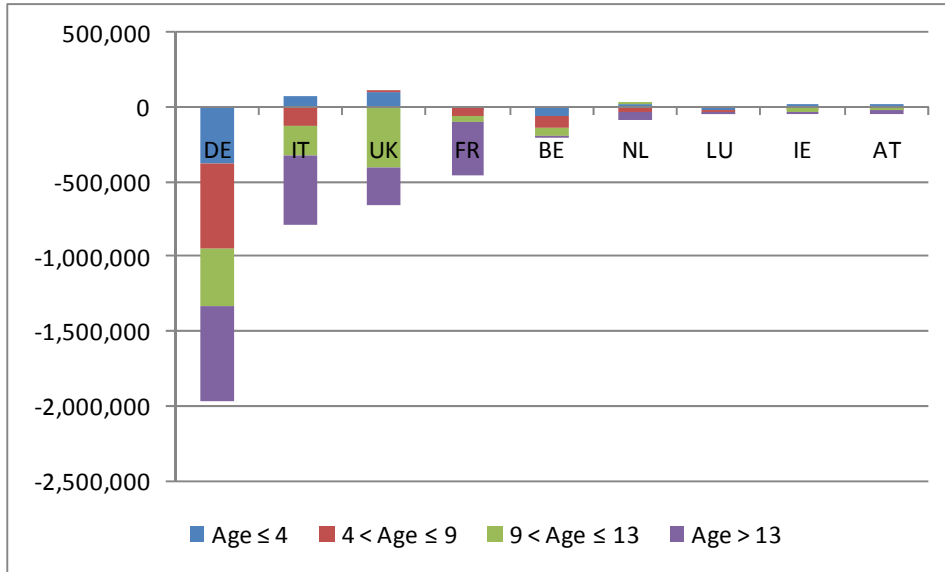


Figure 31: Net exporters of vehicles (M1+N1), average number of vehicles 2004 - 2009
Note: Export reported as negative figures, import reported as positive figures; adjusted for additional export.

Including the adjustment for exports to Romania, Bulgaria and extra EU countries increases the general levels of exports in all countries. Germany alone still stands for half of all export of second-hand vehicles. Italy and UK account for 17% and 13% of all export of second-hand vehicles.

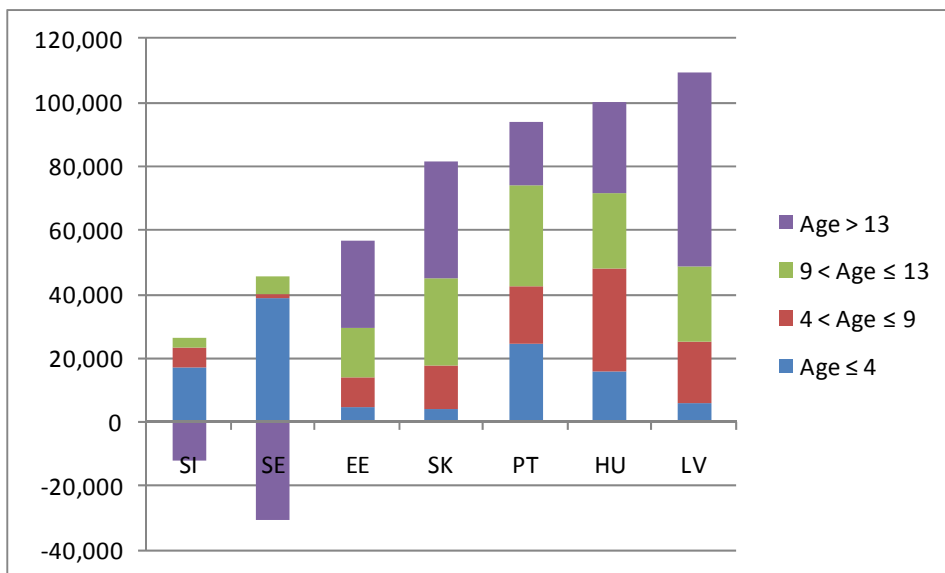


Figure 32: Net importers of vehicles (M1+N1), average number of vehicles 2004 - 2009
Note: Export reported as negative figures, import reported as positive figures; adjusted for additional export.

Importing countries belong to different segments. Slovenia and Sweden import mainly vehicles of more recent date being up to four years old.

Estonia, Slovakia, Latvia, Hungary and Portugal all import significant numbers of old vehicles, including both 9-13 years and above 13 year-old vehicles.

The following figure shows second-hand car imports in countries importing above 120,000 vehicles annually. As can be seen, imports of old vehicles to Spain, Czech Republic and Poland are high. Especially Poland is importing a large number of old vehicles above 13 years old.

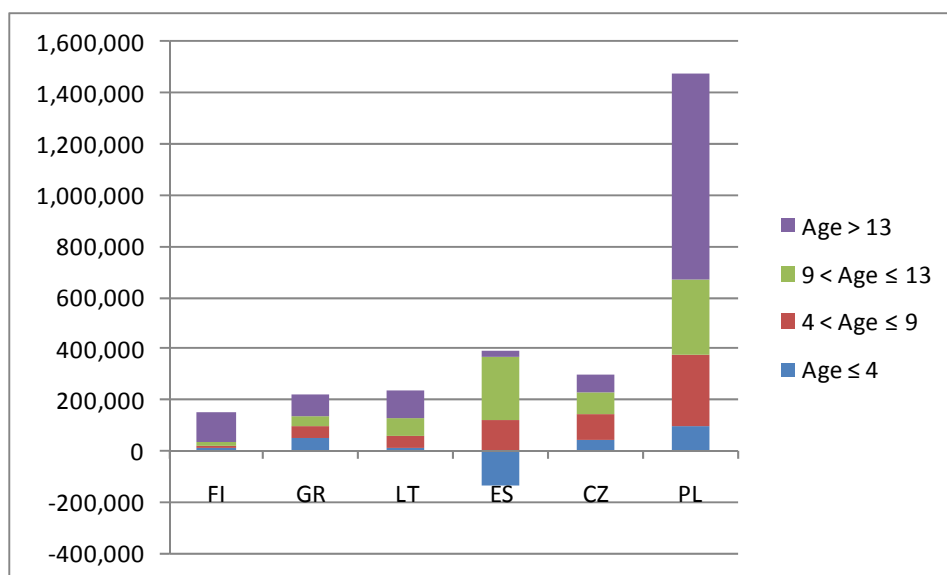


Figure 33: Large net importers of vehicles (M1+N1), average number of vehicles 2004 - 2009 Note: Export reported as negative figures, import reported as positive figures; adjusted for additional export.

A few clear conclusions can be drawn:

- Only a few countries have net exports: The main exporters are UK, Italy, France and particularly Germany. Germany accounts for approx. half of all exports of second-hand vehicles.
- A large number of countries import many medium-aged and old vehicles.
- Poland, Czech Republic and Spain account for most import of old vehicles. Poland imports 58% of all vehicles above 13 years of age, while Spain, Czech Republic and Poland together import 69% of all vehicles 9 - 13 years of age.
- Conclusions are as expected: the less wealthy countries have higher import rates of medium-aged and old cars.

2.3.4.7 Discussion and comparison with other sources

- The order of magnitude of total net exports meets the level derived by other sources. Thus the methodology seems applicable.
- For instance for Germany the calculations in Table 26 display an amount of at least 1.6 million net export of M1 + N1 for 2008 while the average calculated in Figure 31 display slightly less than 2 million export. At the same time a number of unknown whereabouts of 0.85 million vehicles (see Figure 6) is reported. As already expressed earlier this 0.85 might on one hand contribute to not reported export of used cars and on the other hand to export of used cars for the use of spare parts thus a not reported Export of ELVs.
- For Slovakia the net import of M1 cars considered in Chapter 2.3.3.2 for 2008 is 95 000 cars. This matches well with the average for 2004 to 2009 of approx. 85 000 (see Figure 18).
- For the Czech Republic applies the same. The net import of M1 cars, reported by the national authorities amounts to 210 000 in 2007, 220 000 in 2008 and 130 000 in 2009. (see table 35). Additional unreported imports of 120 000 to 145 000 are estimated. Again this matches well with the calculated amount > 300 000 as average for the years 2004 to 2009 displayed in Figure 18.
- For Poland the issue is more difficult as the figures for the total fleet do not match. Thus more investigations are needed to harmonise the different sources. However still the general conclusion that Poland is by far the country with the highest number of imports remains valid.
- In result the analysis gives robust information on the internal imports and exports in the EU. Having in mind the confirmation of the level of magnitude by other sources, the results for those countries, where no other sources are available are at first sight reliable too.
- However the assumption of similar scrappage rates in the same age group in all countries may not be correct. In countries with heavily taxed cars or other economic conditions, it may be argued that repair costs are lower compared with the capital cost leading to lower scrap rates. Thus in result it is recommended to take the calculations as a first estimate only, where national sources are required to provide more evidence.

2.3.5 Indicators and economic drivers

One aim of the project is to examine indicators and economic drivers to be used for modelling or forecasting the level of import or export of used cars.

The target value is defined as the net export. Net export because some “transfer” countries were identified such as BE, NL and LT which have both high import and export rates thus a reflection to solely import or to export would provide misleading results.

The net export is calculated as follows:

$$\text{Net export} = \text{intra-EU27 export} + \text{extra-EU27 export} - \text{intra-EU27 import} - \text{extra-EU27 import}$$

where the respective values are based on the estimations explained in Chapter 2.3.2. The limitations of this estimation, in particular the underestimation of the imports and exports, need to be kept in mind.

The following four different economic drivers were tested for their relevance on the import and export of used vehicles:

- Total final consumption of households, per capita (Figure 34).
- GDP, per capita (Figure 35).
- Final consumption of households for transport, per capita (Figure 36).
- Net disposable income of households, per capita (Figure 37).

All economic drivers have been extracted from Eurostat’s sources and more detailed information including metadata, flags and date of extraction as well as information on the calculation method for “per capita”- values is electronically available as stated in Annex 1. The selected four economic drivers have their particular strengths and weaknesses as shown below:

Table 50: Strengths and weaknesses of the four economic indicators used for correlation

Indicator	Weakness	Strength
Total final consumption of households, per capita.	Only covers households and not activities of other economic units.	Complete data set.
GDP, per capita.	No data for “GDP” for Belgium and Cyprus.	Entire economy covered. Forecast available
Final consumption of households for transport, per capita.	No data for “final consumption of households for transport” for Bulgaria and Portugal. Only covers households and not activities of other economic units. Data quality “for transport” is worse than “total consumption of households”	Indicator directly addresses the expenditures for transport sector.
Net disposable income of households, per capita.	No data for “net disposable income of households” for Cyprus, Luxembourg and Malta. Data for 2007 only (2008 not yet published). Only covers households and not activities of other economic units.	Effect of difference between income and consumption visible.

Having the different characteristics of the economic drivers in mind, the main general observation for the import / export of used vehicles is that practically all new Member States (MS) have net import, i.e. negative net export (see Figure 34 to Figure 37, EU 12 = black bullets). The only exception is Slovenia where an effect of the nearby Balkan area (i.e. extra-EU 27 export) is likely. There seems to be a threshold of approx. € 12 500 total final consumption per capita, respectively € 20 000 GDP per capita above which export activities start to exceed imports. Most EU 15 countries (yellow triangles in Figure 34 to Figure 37) are hence net exporters (with exception of IE, FI, CY). However, no relevant correlation within the groups of EU 15 and EU 12 can be identified.

Other factors such as

- limitations of the data quality for the import and export of used cars,
- national regulations for re-registration,
- national tax regimes,
- national scrapping schemes,
- the (historical) regional connection to nearby extra-EU markets (e.g. SI) and
- national car industry connected to “home market”

and maybe others are likely to additionally influence the market so that no straight-forward correlation can be provided.

However, it might improve modelling / forecasting if the national levels for import respectively export identified in Chapter 2.2 (national sources) 2.3.2 (relevance) were used as a default value. As long as no other correlation is available the above-mentioned thresholds for GDP or consumption might be used for cross-checking these default values.

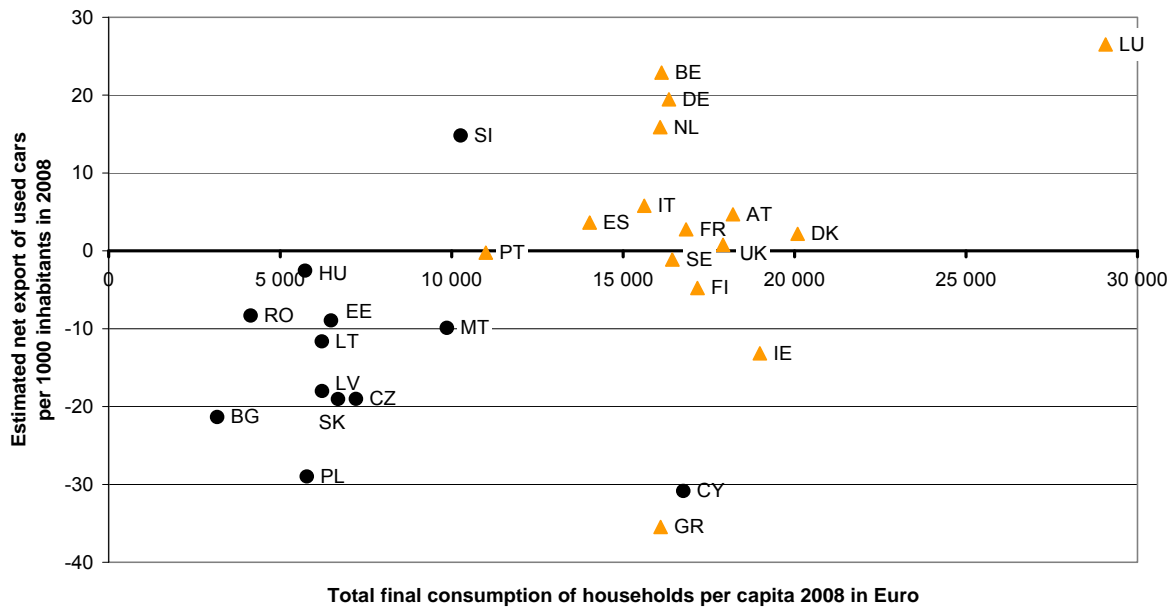


Figure 34: Net export of used vehicles (M1+N1) according to total final consumption of households

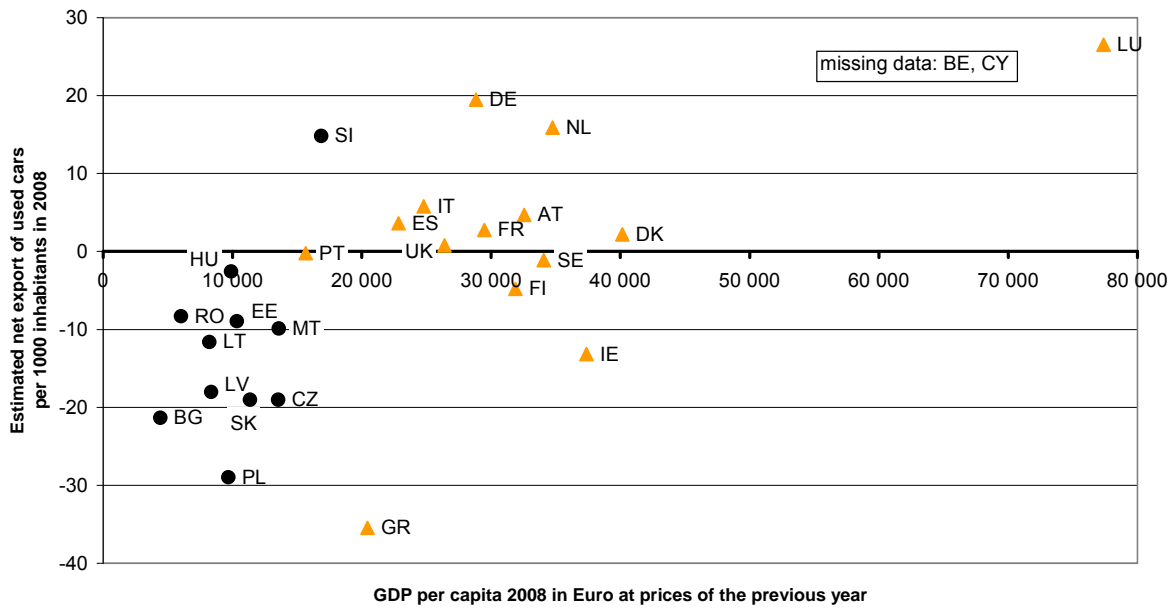


Figure 35: Net export of used vehicles (M1+N1) according to GDP per capita

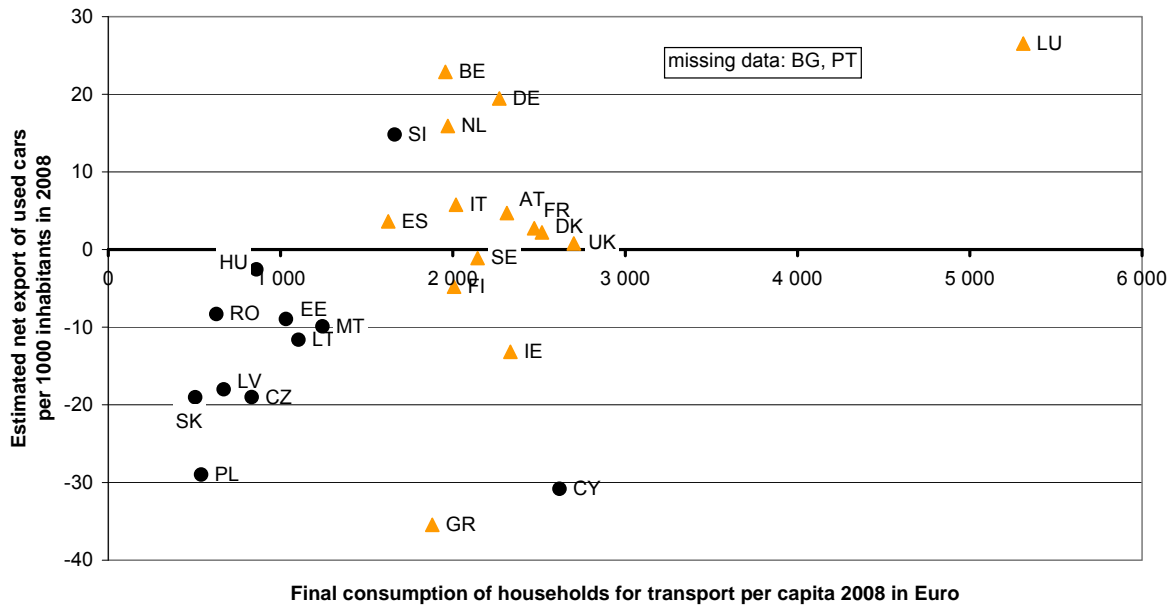


Figure 36: Net export of used vehicles (M1+N1) according to final consumption of households for transport

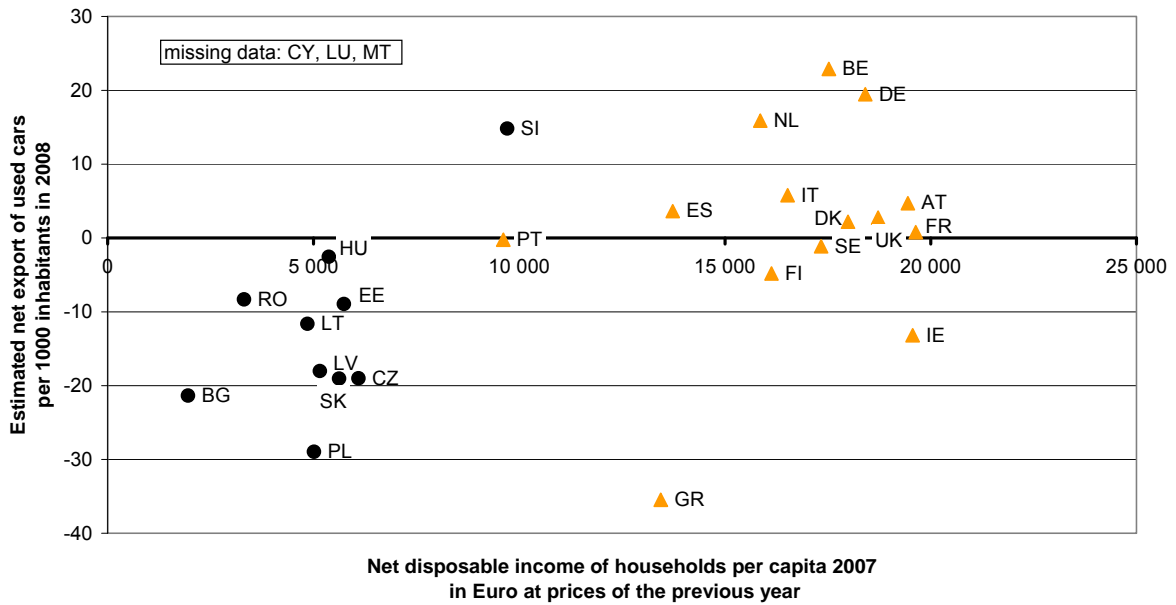


Figure 37: Net export of used vehicles (M1+N1) according to disposable income

3 Usage Patterns

When looking at the potential influence of the second-hand car market on aspects of the complete transport field (e.g. transport demand, vehicle use, transport energy demand, transport emissions, etc.), different types of data need to be considered. On the one hand, it is important to collect data on the number of vehicles that are traded within and between countries in order to form a better picture of the life cycle of the vehicles, from their first day of registration, over their selling-on as a used car up to their time of scrapping. On the other hand, it is also important to collect data on the effective use of these vehicles throughout their entire lifespan. Gathering of information on and the analysis of these usage patterns forms the second part of the present study.

3.1 Literature review

Given the importance of specific knowledge (concrete data, theoretical or practical knowledge) related to usage patterns in assessing the possible impacts of an increase in the market share of used vehicles with its implicit influence on fleet emissions or road safety, an extensive literature study was performed to gather information on usage patterns in relation to used cars on the one hand and change in ownership on the other hand.

A starting point for the literature study was the list of indicators that were suggested in the ToR:

- average annual vehicle kilometres
- driving patterns (urban-rural-highway shares)
- occupancy rates
- engine size / emissions
- accident statistics
- lifetime functions / scrappage functions
- segment differentiation

We looked for directly- and indirectly-related information in order to be able to use proxies if no direct information was found. In the first instance, a search for information on an EU-wide level was conducted.

The data sources used were the following:

- Scientific literature
 - Research databases
 - Economy: Business Source Premier, CEPR Discussion Papers, consumenten- en huishoudstudies, EconLit, EconPapers, London School of Economics
 - Psychology (through PsycINFO ⁶)
 - Research institutes
 - Belgian Road Safety Institute
 - Kuratorium für Verkehrssicherheit
 - VSRC – Loughborough University
 - MUARC – Monash University

⁶ <http://www.ovid.com/site/catalog/DataBase/139.jsp>

- Danish Transport Research Institute
- Centre for Automotive Management – University of Buckingham
- Statistical sources – annual reports
 - GOCA: groepering van erkende ondernemingen voor autokeuring en rijbewijs (vehicle inspection Belgium with connections to international umbrella organisations)
 - Federauto: Belgian Group for companies involved in second-hand car market
 - Assuralia: umbrella organization for Belgian insurance companies
- National administration
 - FOD economie Belgium (responsible for Carpass)
- International organisations & statistical information services
 - OECD
 - Eurostat
 - International Transport Forum (ITF)
- European administration
 - DG MOVE
 - DG COMP
 - DG MARKET.

As a result of this search, we can say that little or no direct or indirect information (data, sound practical or theoretical knowledge) is available that describes usage patterns in relation to second-hand vehicles or changes in vehicle ownership. As a direct result, no definitive selections in relation to the creation of indicators or the use of proxy variables linked to usage patterns and second-hand vehicles could be made.

As far as information on usage patterns for *all vehicles* is concerned, we can refer to the TREMOVE model (TREMOVE, 2007, recent update 2009), with information fed from TRENDS and FLEETS (FLEETS, 2008).

As a result of these findings and different interviews with stakeholders, it was assumed to be difficult to get additional information by a survey on usage patterns in relation to used cars or changes in usage patterns linked to changes in vehicles ownership. Thus it has been agreed with the client that the focus should not be on the immediate data collection on usage patterns in relation to used cars or change in ownership but rather on regional differences (possibly connected by economic drivers) in the entire usage patterns for all vehicles, described by the age distribution of the fleets, the vehicle kilometres according to type and age of a vehicle and so on.

3.2 Data collection

In order to access information available at the level of national administration and organisations a survey was conducted, the second part of which dealt with usage patterns (see Annex 4). The main goal was to obtain data on various aspects of the usage patterns where it was suspected that differences could exist between first hand vehicles and used vehicles of the categories M1 (Passenger Cars) and N1 (Light Commercial Vehicles). Seven distinct elements were identified:

- 1) annual and total vehicle kilometres travelled
- 2) vehicle age according to vehicle kilometres

- 3) annual vehicle kilometres according to vehicle age
- 4) vehicle price
- 5) road types used
- 6) vehicle occupancy rates
- 7) accident rates

Various public and private stakeholders were addressed: national administrations, public services, vehicle manufacturers, etc.

In the following chapters the data collected from different respondents are presented and discussed. Since it was already clear during the development of the questionnaire that data availability in relation to used cars would be scarce at best, additional data sources were also looked for that may complete information gaps. Data were collected for the entire fleet (irrespective of type of vehicle ownership) in order to make a potential comparison between used and new vehicles possible. Furthermore, since the main goal of this study is to make a comparison between first hand and used cars, we tried to collect data that would allow for such a comparison despite obvious data gaps in relation to vehicle ownership. Rather, data was requested in relation to indicators linked to increased probability of used car ownership (vehicle kilometres and vehicle age).

For both the data collected via the survey as well as data collected in parallel, we will discuss the most important findings. Either data availability as such or, where possible, a limited data analysis in the format of two test cases will be presented in the following chapters. When available, data for both vehicle categories M1 and N1 is presented. For the data collected from the questionnaires, a short descriptive statistic will precede the presentation of the actual data collected.

Apart from the questionnaire, various sources for alternative data collection were also considered as a result from information collected from the different respondents. Eventually, data was also collected from the existing Eurostat Transport database, the CARE database (CARE, 2010) and the study "Mobility in Germany" (MiD, 2010). Goal of this data collection was the filling in of information gaps from the questionnaire.

Data was also collected from the REMOVE database. Data from the FLEETS project (FLEETS, 2008) and the TREMOD model (2008, updated version TREMOD, 2010) that were used as input data for the REMOVE model were also collected. Vehicle fleet statistics (stock, vehicle kilometres and survival parameters) from TREMOD were an input to the FLEETS project, which itself was used as input to REMOVE. However, for emission factors and total demand (including split over road types), REMOVE used its own sources, i.e. COPERT IV (emissions) and SCENES/TRANS-TOOLS/ASTRA (demand). This collection of data did not serve the purpose of filling in information gaps from the questionnaire since it is exactly in such a database that potential over- or underestimation of usage pattern related parameters for used vehicles can exist. Rather it is the aim of the present study to generate data which could be used to improve the modeling quality of the aforementioned databases.

3.3 Data collected through the questionnaire

3.3.1 Item 1: Vehicle kilometres

Item 1 of section B of the questionnaire (see Annex 4) aimed at gathering information on the number of vehicle kilometres that are travelled by used vehicles (M1 and N1) in relation to their age. When information on vehicle age was unavailable, data irrespective of vehicle age was collected.

Table 51: Descriptive statistics Item 1 (Questionnaire)

Item 1	Vehicle kilometres (annual average)
Number of respondents	8
Number of answers withheld	4
Countries withheld	Denmark, Finland, Ireland, United Kingdom

Table 52: Collected data Item 1 (Questionnaire)

Item 1	Vehicle kilometres (annual average)			
	M1 (all ages)	N1 (all ages)	Data source	Data year
Denmark	16 776	14 290	Empirical data	2008
Finland	17 100	12 200	National stat.	2009
Ireland	16 376	-	National stat.	2008
United Kingdom	14 866	20 618	National stat.	2008

Although data from Belgium was also received, this data was incomplete. Furthermore, respondents from France, Hungary and Estonia responded to the request but without providing sufficiently detailed information.

Detailed information of annual vehicle kilometres travelled differentiated by the age of vehicles was not provided by any of the respondents. This information would deliver greater insights into different vehicle usage patterns in relation to the age of the vehicle itself. In the current form, data does not allow for a meaningful analysis of usage patterns.

Remarks related to the lack of detailed data in relation to vehicle age were also collected. The following problems occurred:

- The requested data does not exist.
- Calculation of requested data would take a significant amount of unpaid time.
- Projects that would provide the requested data are ongoing but so far no data has become available.

3.3.2 Item 2: Vehicle age according to total vehicle kilometres

Item 2 of section B of the questionnaire (see Annex 4) aimed at gathering information on the age of vehicles (M1 and N1) in relation to the total vehicle kilometres travelled. This item can provide information on the ageing process of vehicles and provide a reliable comparison for, for example, scrappage functions.

Table 53: Descriptive statistic Item 2 (Questionnaire)

Item 2	Vehicle age (~ total vehicle kilometres)
Number of respondents	3
Number of answers withheld	2
Countries withheld	Belgium, Hungary

Table 54: Collected data Item 2 (Questionnaire)

Item 2	Data source	Data year	Vehicle age (~ total vehicle kilometres)								
			M1					N1			
Country			∨ 10 000	^ 10 000 ∨ 50 000	^ 50 000 ∨ 100 000	^ 100 000	∨ 10 000	^ 10 000 ∨ 50 000	^ 50 000 ∨ 100 000	^ 100 000	
Belgium	National stat.	2009	13	8	-	-	15	7	-	-	
Hungary	Best guess	2005	15	10	4	2	20	10	7	5	

Although three respondents answered this item, one response was eliminated due to incomplete data. The two remaining responses do not seem to be in line with what would be expected to be a possible answer. This is possibly the case due to an interpretation error. If respondents provide data in relation to “total vehicle kilometres”, we would expect to see an increase in age with an increase in vehicle kilometres. If respondents provide data in relation to “annual vehicle kilometres”, we would expect to see a decrease in age with an increase in vehicle kilometres. Clarification from the different respondents was asked but not received.

3.3.3 Item 3: Fleet vehicle kilometres according to vehicle age

Item 3 of section B of the questionnaire (see Annex 4) aimed at gathering information on the fleet use (M1 and N1) in relation to vehicle ages. This item can provide information on the ageing process of vehicles and provide a reliable comparison for, for example, scrappage functions.

Table 55: Descriptive statistic Item 3 (Questionnaire)

Item 3	Fleet vehicle kilometres ~ vehicle age
Number of respondents	0
Number of answers withheld	0
Countries withheld	-

None of the respondents provided data for this item.

3.3.4 Item 4: Annual vehicle kilometres according to type of road

Item 4 of section B of the questionnaire (see Annex 4) aimed at gathering information on annual usage of vehicles (M1 and N1) in relation to the types of roads these kilometres are driven on. This item provides information on the type of usage of vehicles and provides a reliable comparison for, for example, emission functions.

Table 56: Descriptive statistic Item 4 (Questionnaire)

Item 4	Annual vehicle kilometres ~ road type
Number of respondents	2
Number of answers withheld	2
Countries withheld	Hungary, Finland

Very little information was provided for this item. Although this type of information should be readily available from national statistics when no detailed information is asked in relation to vehicle age, data proved to be unavailable when this parameter was added. Hungary provided an estimation of the shares driven on different roads for the different vehicle age categories. Finland provided absolute data independent of vehicle age.

Table 57: Collected data Item 4 (Questionnaire Hungary)

Item 4		Annual vehicle kilometres ~ road type					
Country	%	Vehicle age	Urban	Rural	Highway	Data source	Data year
Hungary	M1	< 2 years	40	30	30	Best guess	2005
		> 2yrs < 5yrs	40	30	30		
		> 5yrs < 10yrs	40	40	20		
		> 10years	40	40	20		
	%	Vehicle age	Urban	Rural	Highway	Data source	Data year
	N1	< 2 years	50	40	10	Best guess	2005
		> 2yrs < 5yrs	50	40	10		
		> 5yrs < 10yrs	50	40	10		
> 10years		50	45	5			

Table 58: Collected data Item 4 (Finland)

Item 4		Annual vehicle kilometres ~ road type					
Country	Mvkm	Vehicle age	Urban	Rural	Highway	Data source	Data year
Finland	M1	All ages	15 390	10 901	18 994	National stat.	2009
	Mvkm	Vehicle age	Urban	Rural	Highway	Data source	Data year
	N1	All ages	1 300	921	1 604	National stat.	2009

3.3.5 Item 5: Vehicle occupancy rate

Item 5 of section B of the questionnaire (see Annex 4) aimed at gathering information on the vehicle occupancy rate (M1 and N1). This item can provide information on the type of usage of vehicles.

Table 59: Descriptive statistic Item 5 (Questionnaire)

Item 5	Vehicle occupancy rate
Number of respondents	2
Number of answers withheld	1
Countries withheld	Finland

Table 60: Collected data Item 5 (Questionnaire)

Item 5	Vehicle occupancy rate		
Country	M1	Data source	Data year
Finland	1.4	National stat.	2009

None of the respondents provided information on vehicle occupancy rate according to vehicle age.

3.3.6 Item 6: Vehicle purchase price

Item 6 of section B of the questionnaire (see Annex 4) aimed at gathering information on vehicle prices (M1 and N1). This item can provide information on vehicle acquisition choice.

Table 61: Descriptive statistic Item 6 (Questionnaire)

Item 6	Vehicle purchase price
Number of respondents	1
Number of answers withheld	1
Countries withheld	Austria

Table 62: Collected data Item 6 (Questionnaire)

Item 6	Vehicle purchase price				
Country	Vehicle size			Data source	Data year
	Small	Medium	Large		
Austria	€ 8 923	€ 14 478	€ 26 808	-	-

None of the respondents provided information on vehicle prices with distinctions for different vehicle ages.

3.3.7 Item 7: Fatal accidents

Item 7 of section B of the questionnaire (see Annex 4) aimed at gathering information on vehicle safety (number of fatal accidents M1 and N1). This item can provide information on potential safety effects in relation to vehicle age.

Table 63: Descriptive statistic Item 7 (Questionnaire)

Item 7	Fatal accidents
Number of respondents	6
Number of answers withheld	3
Countries withheld	Estonia, Finland, Ireland

Table 64: Collected data Item 7 (Questionnaire)

Item 7	Fatal accidents				
Country	M1 (all ages)	N1 (all ages)	M1+N1 (all ages)	Data source	Data year
Estonia	-	-	50	National stat.	2009
Finland	216	19	235	National stat.	2009
Ireland	139	-	-	National stat.	2008

Very little information was provided for this item. Although this type of information should be readily available from national statistics when no detailed information is requested in relation to vehicle age, data proved to be unavailable when this parameter was added.

3.4 Data collection parallel to the questionnaire

A number of data sources were used to create a comparison basis: Eurostat data, CARE database & TREMOVE/FLEETS data.

3.4.1 Eurostat Transport database

Various searches were performed in the Eurostat Transport database in order to collect similar data to the one that was asked to the respondents of the questionnaire. As a result, data was collected in relation to the following items:

- Item 1: Vehicle kilometres (annual average)
- Item 3: Fleet vehicle kilometres according to vehicle age
- Item 4: Annual vehicle kilometres according to type of road

3.4.1.1 Item 1: Vehicle kilometres (annual average)

The Eurostat database contains data for some countries on the total annual vehicle kilometres travelled for the fleet, differentiated by vehicle age. It needs to be noted however that the different age categories effectively contain different timespans: the first four categories cover annual periods while the next four categories span two-year periods. This makes direct comparison of the vehicle kilometres travelled according to different vehicle ages somewhat unreliable.

Table 65: Total vehicle kilometres differentiated by age (Eurostat Transport)⁷

Item 1	Total vehicle kilometres (2008; category M1, Mvkm)								
Vehicle age	<1y	1y	2y	3y	4-5y	6-7y	8-9y	10-11y	>12y
Netherlands	6 042	10 385	9 257	7 990	13 771	13 266			
Poland	2 399	2 399	2 399	3 143	6 286	10 973	10 973	13 097	86 188
Sweden	2 798	8 123	6 976	5 916	8 443	7 080	9 074	6 566	12 738
Norway	1 342	3 042	2 508	2 473	4 464	3 498	3 475	3 809	8 104

In combination with information on the number of registered vehicles in these countries of a specific age, this would allow for the calculation of the annual vehicle kilometres in these time spans. The Eurostat database does contain this type of information but for different year spans.

Table 66: Registered vehicles differentiated by age (Eurostat Transport)⁸

Item 1	Registered vehicles by age of vehicle (2008; thousands)			
Country	<2y	2-4y	5-9y	>10y
Netherlands	985	1 384	2 516	2 658
Poland	839	1 101	3 202	10 938
Sweden	734	757	1 381	1 406
Norway	244	379	574	1 001

To a certain extent this would enable calculation of the annual vehicle kilometres travelled for vehicles in the different age categories. It needs to be noted that the middle category of “2 to 4 year old vehicles” does not match precisely with the categories in the previous table. We have corrected this mismatch in our calculations by using the annual averages. As a result, we calculated the following annual vehicle kilometres for Poland, Sweden and Norway. Data from the Netherlands was omitted because the data was incomplete for older vehicles.

⁷ Data set: DS-075270-Road traffic on national territory by type and age of vehicle (million VKm)
(electronically available see Annex 1)

⁸ Dataset: DS-073036-Passenger cars, by age (number) (electronically available see Annex 1)

Table 67: Annual vehicle kilometres differentiated by age (Calculated from Eurostat)

Item 1	Annual vehicle kilometres (2008; category M1, vkm)			
Country	<2y	2-4y	5-9y	>10y
Poland	5 719	7 888	8 151	8 358
Sweden	14 879	22 607	14 684	12 906
Norway	17 967	19 032	16 368	11 495

3.4.1.2 Item 3: Fleet vehicle kilometres according to vehicle age

The Eurostat Transport database contains data for some countries on the total annual vehicle kilometres travelled for the fleet, differentiated by vehicle age. It needs to be noted however that the different age categories effectively contain different timespans: the first four categories cover annual periods while the next four categories span two-year periods. This makes direct comparison of vehicle kilometres driven according to vehicle age somewhat unreliable.

Table 68: Total vehicle kilometres differentiated by age (Eurostat Transport)

Item 1	Total vehicle kilometres (2008; category M1, Mvkm)								
Vehicle age	<1y	1y	2y	3y	4-5y	6-7y	8-9y	10-11y	>12y
Netherlands	6 042	10 385	9 257	7 990	13 771	13 266			
Poland	2 399	2 399	2 399	3 143	6 286	10 973	10 973	13 097	86 188
Sweden	2 798	8 123	6 976	5 916	8 443	7 080	9 074	6 566	12 738
Norway	1 342	3 042	2 508	2 473	4 464	3 498	3 475	3 809	8 104

In average terms, this leads to the following distribution (data from the Netherlands was omitted because data was incomplete for older vehicles).

Table 69: Total vehicle kilometres (relative) differentiated by age (Eurostat)

Item 1	Total vehicle kilometres distribution (2008; category M1, % of Mvkm)								
Vehicle age	<1y	1y	2y	3y	4-5y	6-7y	8-9y	10-11y	>12y
Poland	1.7%	1.7%	1.7%	2.3%	4.6%	8.0%	8.0%	9.5%	62.5%
Sweden	4.1%	12.0%	10.3%	8.7%	12.5%	10.5%	13.4%	9.7%	18.8%
Norway	4.1%	9.3%	7.7%	7.6%	13.6%	10.7%	10.6%	11.6%	24.8%

3.4.1.3 Item 4: Annual vehicle kilometres according to type of road

The Eurostat Transport database contains data for some countries on the vehicle kilometres travelled on different types of roads which are reasonably complete for the N1 category. There is however no distinction made between different vehicle ages making an analysis on differences in usage patterns between different vehicle ages impossible.

Table 70: Annual vehicle kilometres differentiated by type of road (Eurostat Transport)

Item 4	Annual vehicle kilometres according to type of road (category N1, Mvkm)					
Data year	Road type	Latvia	Lithuania	Poland	Romania	United Kingdom
2008	Motorways		48.2	376	28.0	12 278
	Urban	486.5		3 997	331.5	24 844
	Rural	486.5	466.2	8 728	673.1	30 975
2007	Motorways			302		12 490
	Urban	566.0		3 940		24 906
	Rural	482.1		8 397		31 002
2006	Motorways					12 070
	Urban	451.6				24 148
	Rural	426.1				28 937
2005	Motorways					11 325
	Urban	352.0				23 385
	Rural	413.2				27 851

3.4.2 CARE database

3.4.2.1 Item 7: Fatal accidents

The CARE database (CARE, 2010) offers an overview of statistics in relation to road fatalities. However, the data that are publicly available present the total number of fatalities and not the number of fatal accidents. This means, for example, that it is not possible to be sure about the accident composition for the pedestrian or cycling fatalities (M1, N1 or other). We therefore elect to only present the number of fatalities that are linked directly to the vehicles. Furthermore, terminology in relation to the vehicle category N1 is potentially flawed, causing possible overlap or shift of fatality registration between vehicle categories. Information on fatal accidents in relation to vehicle age is currently not available.

Table 71: In-vehicle fatalities (CARE database)

Item 7	Fatal accidents (number of fatalities; in vehicle, 2008)	
	Person cars (and taxis)	Lorry, ≤ 3.5 tonnes
Belgium	479	40
Czech Republic	573	27
Denmark	196	22
Germany	2 368	92
Estonia	69	
Ireland	160	16
Greece	708	62
Spain	1 495	189
France	2 205	134
Italy	2 116	40
Latvia	167	2
Luxembourg	20	
Hungary	448	33
Malta	4	
Netherlands	299	31
Austria	367	19
Poland	2 540	
Portugal	358	88
Rumania	1 321	
Slovenia	82	3
Slovakia	282	3
Finland	202	9
Sweden	230	11
United Kingdom	1 312	47

3.4.3 German Mobility Study

A supplementary source of information is a recently published survey "Mobility in Germany" (MiD, 2010), where a comprehensive survey of 28 000 households is made on one day total mobility. In this database, it is possible to find data related to item 1 (annual vehicle kilometres according to vehicle age) and item 5 (vehicle occupancy rate). We have limited our data search to vehicles constructed from 1990 onwards in order to have a sufficiently large data subset for each of the construction years.

Table 72: Annual vehicle kilometres and vehicle occupancy (MiD, 2010)

Items 1 & 5		Annual vehicle kilometres (2008)			
Germany		Diesel		Gasoline	
Construction year	Vehicle age	Vehicle kilometres	Vehicle occupancy rate	Vehicle kilometres	Vehicle occupancy rate
1990	19	16 781	1.45	9 583	1.37
1991	18	15 454	1.31	12 879	1.39
1992	17	13 922	1.21	9 193	1.38
1993	16	16 721	1.41	10 833	1.40
1994	15	16 330	1.61	10 688	1.40
1995	14	18 832	1.43	11 577	1.38
1996	13	15 842	1.48	11 450	1.39
1997	12	15 992	1.55	11 180	1.47
1998	11	19 534	1.64	12 500	1.45
1999	10	18 333	1.55	11 417	1.48
2000	9	18 831	1.58	11 719	1.44
2001	8	18 423	1.55	12 515	1.46
2002	7	19 061	1.59	11 843	1.47
2003	6	21 241	1.57	12 421	1.42
2004	5	20 854	1.60	11 629	1.49
2005	4	24 359	1.59	12 687	1.44
2006	3	26 943	1.49	12 816	1.46
2007	2	30 650	1.51	13 585	1.42
2008	1	27 154	1.60	13 550	1.48

3.4.4 REMOVE database

Existing reports and studies, commissioned by the EC, contain useful information for this study. We looked into data used in the REMOVE model, with a particular focus on vehicle stock data. These were recently (2007-2008) collected in the FLEETS project (FLEETS, 2008). While the data may not provide extra knowledge on the subject of second-hand cars, they do give an insight into the relationship between a car's age profile and its usage. The purpose of the presentation of these data is not to fill in data gaps for the analysis of usage patterns of second-hand cars, precisely because of the lack of information on that particular group of vehicles during the creation of the REMOVE database. Rather more, it serves the purpose of providing a background for potential comparison with newly collected data.

The main questions of part B of the survey (see Annex 4) where FLEETS / REMOVE provide an output for (in *italics*) and the respective outputs are discussed below:

*B 1) Can you provide an estimate or data on the **average total mileage or the yearly mileage** for passenger cars (M1) and light utility vehicles (N1)?*

B 1.1) Can you provide these data in dependence of the age of the car?

*B 2) Can you provide an estimate or data on the **average age** for passenger cars (M1) and light utility vehicles (N1) **in dependence of the total mileage** of the vehicle?*

From FLEETS output, the annual vehicle kilometres of different vehicle types and the vehicle kilometre degradation profile can be derived. As cars get older, they tend to be driven less on average. The greatest annual change in vehicle kilometres occurs between the 9th and 12th year of vehicle operation (just over 94% of previous year's mileage – EU 27 average).

The total average vehicle kilometres can be calculated based on the median time of scrappage for each vehicle. With the scrappage parameters used in REMOVE (from FLEETS), it can be calculated at what age 50% of the vehicles of a certain vintage will be scrapped. The cumulative vehicle kilometres at that age give an indication of required information.

*B 5) Can you provide an estimate or data on the **yearly mileage driven on different road types** for passenger cars (M1) and light utility vehicles (N1)? The information might be expressed in percent over road types and ages or as total mileage driven per year.*

B 5.1) Can you provide these data in dependence of the age of the car?

REMOVE uses transport demand data from an external source. In the past, the source was SCENES. A more recent update originated from the TRANS-TOOLS model, while the version currently being developed has the PRIMES model as its source. The split between road types in the latest REMOVE version (3.4) was taken from the TRANS-TOOLS and ASTRA models, as estimated in the iTREN-2030 project. As there is no empirical evidence that cars of a certain age are driven more on certain road types, the split was made in the same proportions over all road types and ages.

*B 6) Can you provide an estimate or data on the **vehicle occupancy rate** for passenger cars (M1) and light utility vehicles (N1)?*

B 6.1) Can you provide this data in dependence of the age of the car?

Occupancy rates (passengers per vehicle) in TREMOVE are still the SCENES values. The documentation on that version discusses the origin of the data (TREMOVE, 2007, page 34). There is no variability based on the age of a vehicle.

Based on the information used in the TREMOVE model, data on a number of items that were questioned in the current questionnaire can also be found. This is in particular the case for:

- Item 1: Vehicle kilometres (annual average)
- Item 2: Vehicle age according to total vehicle kilometres
- Item 5: Vehicle occupancy rate

For the present estimations, vehicle categories were selected that were the most representative for the average vehicle in each country.

3.4.4.1 Item 1: Vehicle kilometres (annual average)

The FLEETS database can provide estimations for the average vehicle kilometres for different vehicle ages and Member States. This can be done for different vehicle categories:

- Person cars
 - o Diesel fuel
 - Small: <1.4 L engine displacement
 - Medium: >1.4 L - <2.0 L engine displacement
 - Large: >2.0 L engine displacement
 - o Gasoline
 - Small: <1.4 L engine displacement
 - Medium: >1.4 L - <2.0 L engine displacement
 - Large: >2.0 L engine displacement
- Vans
 - o Diesel fuel
 - o Gasoline
- Light duty trucks
 - o Diesel fuel
 - o Gasoline.

Based on this information, in combination with information on the number of vehicles derived from the TREMOVE model, we can estimate what proportion of the total vehicle kilometres are allocated to vehicles of a specific age (Item 3).

3.4.4.2 Item 2: Vehicle age according to total vehicle kilometres

For this item, data are drawn directly from the FLEETS database. For each of the Member States, with the exception of Austria, Belgium, France and Luxembourg medium-sized gasoline cars are taken as the representative car type (M1). For Austria, Belgium, France and Luxembourg these are medium-sized diesel cars. For the N1 vehicle category, the category of diesel vans was selected for all member states. For each of these categories, the FLEETS database allows for an indication of the age of a vehicle for which it reaches the 10 000, 50 000 and 100 000 km marks. In addition, based on the TREMOVE model, we can estimate what age the vehicle would have by the time of predicted scrappage.

Table 73: M1 vehicle age according to total vehicle kilometres (TREMODO/FLEETS/TREMOVE)

Item 2	Vehicle age according to total vehicle kilometres				
	Age of vehicle (M1) at total vehicle km	Age at 10 000 vkm	Age at 50 000 vkm	Age at 100 000 vkm	Age at scrappage
Austria	0	1	2		12
Belgium	0	3	7		8
Bulgaria	0	3	7		11
<i>Switzerland</i>	2				9
Cyprus	0	2	5		16
Czech Republic	0	3	6		7
Germany	0	0	2		15
Denmark	0	2	6		15
Estonia	0	3	7		14
Spain	0	2	4		16
Finland	0	2	4		15
France	0	2	5		15
Greece	0	2	5		18
Croatia	0	3	6		9
Hungary	0	2	5		24
Ireland	0	0	1		9
Italy	0	1	3		13
Lithuania	0	4	9		10
Luxembourg	0	2			4
Latvia	0	1	3		12
Malta	0	2	5		10
Netherlands	0	3	6		11
Norway	1	7	15		17
Poland	0	1	2		13
Portugal	0	2	5		16
Romania	0	3	7		11
Sweden	0	3	7		12
Slovenia	0	3	7		13
Slovakia	0	3	7		21
United Kingdom	0	2	4		11

Table 74: N1 vehicle age according to total vehicle kilometres (TREMODO/FLEETS/TREMOVE)

Item 2	Vehicle age according to total vehicle kilometres			
	Age of vehicle (N1) at total vehicle km	Age at 10 000 vkm	Age at 50 000 vkm	Age at 100 000 vkm
Austria	0	2	5	10
Belgium	0	4	10	8
Bulgaria	0	3	6	5
<i>Switzerland</i>	0	1	3	11
Cyprus	0	2	5	18
Czech Republic	0	3	7	6
Germany	0	3	7	12
Denmark	0	2	4	11
Estonia	0	1	3	18
Spain	0	2	4	17
Finland	0	3	6	12
France	1	1	3	12
Greece	0	5	10	17
Croatia	0	2	4	17
Hungary	0	3	7	20
Ireland	0	3	7	6
Italy	0	1	3	25
Lithuania	0	1	3	12
Luxembourg	0	3	6	10
Latvia	0	1	4	20
Malta	0	3	7	8
Netherlands	0	2	4	9
Norway	0	4	8	11
Poland	0	1	3	15
Portugal	0	5	11	15
Romania	0	3	6	8
Sweden	0	2	4	7
Slovenia	0	2	4	4
Slovakia	0	3	7	
United Kingdom	0	1	3	10

3.5 Detailed evaluation and results

3.5.1 Data availability

In general, data availability for the items of section B of the questionnaire (Annex 4) is very poor. Although a very diverse group of respondents from different Member States has been asked to fill in the questionnaire, very little data was collected. This was in particular the case when data was requested that allowed for the comparison of different vehicle ages, either in terms of years or vehicle kilometres.

A number of issues were identified during the course of the information collection process. Most importantly, it was remarked that the level of detail asked for in the questionnaire was too high. This is both remarkable and understandable at the same time. The questionnaire did allow for the presentation of low-level information (independent of vehicle age) for the different parameters that should, theoretically, not be very difficult to calculate. If administrations do not provide this information, this can be for various reasons: low-level data unavailability (due to limited resources, other focus points, etc.), data sensitivity, etc. On the other hand, the opportunity was also offered to provide data with a higher level of detail (dependent on vehicle age). This data collection round proved that this type of information is currently unavailable.

However, this is not the same as stating that section B of the questionnaire served no use. Different Member States (Austria, Belgium, Denmark, France and the Netherlands) did report that the same or similar information was being collected or proposed to collect in ongoing or future projects. Furthermore, contacts with the statistical office of the European Union (Eurostat) provided a bidirectional information exchange that will help future data collection.

Furthermore, it can be observed that most of the stakeholders contacted for the data collection have a strong administrative background. Within this group of stakeholders, a strong tendency exists to rely on information provided by sister administrations. Although this may be very cost-effective, this can entail a number of problems. Firstly, not all administrations have the same results in mind when collecting data. This may mean that the precise data needed for one administration may not be collected by the other administration. Secondly, with the internet becoming ever more present in households, new data acquisition techniques (internet surveys) become more interesting and less costly over time. However, these techniques are not always well known to administrations.

3.5.2 Data analysis

Due to the general lack of data, a specific content analysis of the data collected through the questionnaire is not possible. However, two alternative data sources did provide data that serve as a test case for the analysis of the data that was asked for:

- the Eurostat Transport database delivered information relevant for Item 1 (annual vehicle kilometres in relation to vehicle age) and Item 3 (distribution of total vehicle kilometres travelled over vehicle age)
- the German Mobility Study (MiD, 2010) delivered information relevant for Item 1 (annual vehicle kilometres in relation to vehicle age) and Item 5 (vehicle occupancy rate).

The data collected from these two sources can be compared to data collected from (for example) the FLEETS database (used as input for the TREMOVE model). Goal of this

comparison is to verify whether or not a need exists for improved data collection.

3.5.2.1 Comparison Eurostat – FLEETS data: annual vehicle kilometres

As a first test case, data collected from the Eurostat Transport database was compared with data collected for the FLEETS project, and extrapolated to 2008 in TREMOVE (resulting in reference year 2008 for both). Since data from the Eurostat database was aggregated over all passenger vehicle types, we performed similar aggregation adjustments on the FLEETS data. When different categories needed to be merged, this was done in accordance with distributions available from the FLEETS project and the TREMOVE model.

Table 75: Comparison annual vehicle kilometres differentiated by vehicle age Eurostat vs. FLEETS/TREMOVE v3.3.2

Item 1		Annual vehicle kilometres (2008; category M1, vkm)			
Country		<2y	2-4y	5-9y	>10y
Poland	Eurostat	5 719	7 888	8 151	8 358
	FLEETS/TREMOVE v3.3.2	12 549	10 820	8 200	4 477
Sweden	Eurostat	14 879	22 607	14 684	12 906
	FLEETS/TREMOVE v3.3.2	17 916	17 091	14 642	11 361
Norway	Eurostat	17 967	19 032	16 368	11 495
	FLEETS/TREMOVE v3.3.2	32 692	31 608	25 362	24 095

When looking at this data, it becomes clear from the start that the differences between reported data on one hand and the data provided by FLEETS to a model such as TREMOVE are very substantial. In general, sizeable differences in data that should not occur can be caused by various reasons. In the case of these data, a number of reasons can be identified: the collection method used is different, the reporting system is different or there is a general error in one of the datasets. Whatever the reason(s) is (are) for these differences, they warrant a high level of attention for future data use. A clear methodology for the collection of these data needs to be considered in the future to enhance comparability.

Apart from the sizeable absolute differences, a second difference can be identified that is of particular interest to the domain of vehicle ageing and usage patterns. The annual vehicle kilometres calculations based on the Eurostat data present a different evolution compared to those calculated based on the FLEETS data. For all three countries, annual vehicle kilometres travelled increase in the beginning of the vehicle lifespan. This is contrary to the FLEETS data where the peak use is expected immediately in the first year the vehicle lifespan and a decrease of annual vehicle kilometres travelled occurs immediately afterwards.

3.5.2.2 Comparison of German Mobility Study (2008) – FLEETS data: annual vehicle kilometres

As a second test case, data collected from a mobility study in Germany was compared with data collected for the FLEETS project (reference year for both is 2008, REMOVE extrapolates fleet data from 2005 to 2008). Since some of the study was aggregated for all diesel- or petrol-fuelled passenger vehicles, we performed similar aggregation adjustments on the FLEETS data. When different categories needed to be merged, this was done in accordance with distributions available from the FLEETS project and the REMOVE model.

Table 76: Comparison annual vehicle kilometres differentiated by vehicle age, German Mobility Study (MiD) vs. TREMOD/FLEETS/TREMOVE v3.3.2

Items 1	Annual vehicle kilometres (2008)				
Germany		Diesel		Gasoline	
Construction year	Vehicle age	German Mobility Study	FLEETS/TREMOVE v3.3.2	German Mobility Study	FLEETS/TREMOVE v3.3.2
1990	19	16 781	6 416	9 583	6 434
1991	18	15 454	7 330	12 879	6 757
1992	17	13 922	8 212	9 193	6 896
1993	16	16 721	9 202	10 833	7 420
1994	15	16 330	10 282	10 688	7 798
1995	14	18 832	11 433	11 577	8 188
1996	13	15 842	12 646	11 450	8 574
1997	12	15 992	13 940	11 180	8 981
1998	11	19 534	15 287	12 500	9 377
1999	10	18 333	16 694	11 417	9 772
2000	9	18 831	18 126	11 719	10 180
2001	8	18 423	19 586	12 515	10 592
2002	7	19 061	21 067	11 843	11 005
2003	6	21 241	22 494	12 421	11 411
2004	5	20 854	23 886	11 629	11 805
2005	4	24 359	25 177	12 687	12 571
2006	3	26 943	26 381	12 816	12 929
2007	2	30 650	27 439	13 585	13 267
2008	1	27 154	29 057	13 550	13 865

Again, sizeable absolute differences between reported data on the one hand and the data provided by FLEETS to a model such as REMOVE on the other hand can be observed although they are only noteworthy for older vehicles (diesel fuel: from age 13 years onwards, gasoline fuel: from age 10 years onwards). Similar to the first test case, a number of reasons can be potentially identified for this: the collection method used is different, the reporting system is different or there is a general error in one of the datasets.

A second difference that can be recognised is in the decline rate of annual vehicle kilometres

between both datasets. Where the data from the FLEETS project show a continuous decline with increasing vehicle age, this does appear to be less the case for the data from the mobility study. Although a sharp decline can be observed for diesel-fuelled cars over the first five years, this decline stabilises over the subsequent years to a more stable rate of decline. For petrol-fuelled cars, there is not even a sharp decline in the first years and, in general, a less steep decline in annual vehicle kilometres can be observed in the mobility study data than in the FLEETS/TREMOVE data.

3.5.3 Summary

In general, data availability for the items of section B of the questionnaire (see Annex 4) is very poor. Although a very diverse group of respondents from different Member States has been asked to fill in the questionnaire, very little data was collected. This was in particular the case when data was requested that allowed for the comparison of different vehicle ages, either in terms of years or vehicle kilometres. A number of elements can be identified that may help on improving data collection and quality:

- collection method
- respondent groups
- variable listings, including definitions.

In general, these suggestions can be grouped under the common denominator of providing a more standardised data collection structure. The German Mobility Study (MiD, 2010) can be considered a good example for the collection of detailed mobility data and could provide an initial starting point for the creation of such a potential standardised structure. In addition with the continued introduction of internet at household level, new opportunities arise to collect mobility data.

As far as the data is concerned that was collected in parallel to the questionnaire, two major findings could be identified:

- in absolute terms, differences exist between annual vehicle kilometres that are reported or presented in different databases, projects or models. This should be a cause for caution when using these data. As a result of this, there is still a need for updated mobility data, collected using a carefully detailed and described methodology.
- In relative terms, it was found that the assumptions that are generally accepted in mobility models (a declining trend of annual vehicle kilometres, starting directly after purchase of a new vehicle) are not necessarily mirrored by real life mobility data (an increase in annual vehicle kilometres for the first 2 years and only after that period a decline).

These findings in themselves merit a further data collection of mobility data and research.

4 Effects of policy measures

4.1 General Considerations

Although not within the scope of the study, the questionnaires presented to stakeholders contained a number of questions related to the effects of policy measures on the (purchase of) second-hand cars. This was the result of a number of informal contacts with national administrations whose activities are linked to the monitoring and regulating of various aspects related to national vehicle fleets.

Section C of the questionnaire (see Annex 4) asked respondents information related to, for example, feebate systems, marketing schemes, etc. Information from six countries was received. From these responses, five were classified as related to the feebate or taxation system and one mentioned the presence of marketing influences introduced by the vehicle industry. However, insufficient information was collected to allow for an elaborated analysis.

Since the effects of policy measures as such falls well beyond the scope of the present study, further analyses in relation to policy measures were not executed. Both informal communications and the answers received through the questionnaire indicate that a more comprehensive study addressing the influence of a wider range of potential influences on purchasing behaviour of new or second hand vehicles can be considered. Such a study can aim at analysing the effect of different types of measures (taxation schemes, scrappage schemes, technical inspection legislation & testing, etc.). A significant benefit of such a study would be that it can provide policy makers on different levels with a more practical insight on the regulation of a highly volatile and interactive car market.

5 Conclusions and recommendations

Level of total imports/ exports

- The import and export of used vehicles are of high relevance for the development of the composition of national vehicle fleets. As demonstrated in Chapter 2.3.2 the annual average net import of used vehicles of the EU 12 accounts for (at least) 130% of the registration of new vehicles. Unfortunately the European Statistics for intra-EU trade cannot be used as a reliable source for the cross-border trade of used cars as demonstrated in Chapter 2.1.2.
- In total, the export of used cars to non-EU 27 countries is estimated to be approx. 10% of the fleet exit as demonstrated in Figure 13. Considering the data quality it is estimated that the majority of the unknown whereabouts of the European fleet is not exported to non-EU 27 countries but simply not (yet) reported as ELV.
- The total net import of used cars from non-EU 27 countries to EU is negligible (less than 2%).
- Strikingly, except for Germany, none of the reporting countries referred to the re-registration data collected in the framework of the Directive 1999/37/EC when reporting national exports / imports.
- Detailed balances of fleet entries and exits by vehicle age were carried out for PL, SK and CZ (all of them with more advanced data situation compared to other countries, see Chapter 2.3.3). They provide evidence that the national used-vehicle imports are still underestimated by the provided national sources. According to the established methodology it is likely that import is 60 – 150 % higher than reported (some of this percentage might also be due to incomplete de-registration). Even for the countries with advanced data situation it is not possible to establish detailed fleet balances in order to deduce scrappage rates as a function of vehicle age (by single years of age) without having to rely on uncertain estimates.
- Based on the derivation of an average European scrappage rate a methodology has been proposed in Chapter 2.3.4 to calculate generic net import as a function of vehicle age (by single years of age up to 14 years). This methodology can be easily applied for the coming years. For the derivation commercial fleet data have been purchased at a reasonable price. The calculations provide a rather comprehensive and probable picture of the intra-EU trade of used cars. The fact that the generic net import is broken down by single years of age up to 14 years of age is a major improvement. Unfortunately, due to limited distribution rights for the original fleet data, the full data set cannot be made publicly available. .
- Investigations concerning economic drivers have been carried out. The main general observation is that practically all new Member States (EU 12) have net import of used vehicles (see Figure 34 to Figure 37). The only exception is Slovenia where an effect of the nearby Balkan area is likely (see the high extra-EU 27 export for SI in Table 26). Seemingly there is a threshold of approx. € 12 500 total final consumption per capita, respectively € 20 000 GDP per capita. Above this threshold export activities start to exceed imports. Most EU 15 countries are hence net exporters (with exception of IE, FI, CY). However, no clear correlation within the groups of EU 15 and EU 12 can be identified.

Emissions of imported / exported used vehicles

- Information on
 - age distribution,
 - motor type / size,
 - km of the sold vehicles
 - emission class
 - economic value

is comparatively rare and only a minority of countries provided data on this issue.

As long as the situation does not improve we recommend to rely on vehicle age as an indicator and apply the methodology proposed in Chapter 2.3.4 to derive the national net import rates as a function of vehicle age (by single years of age up to 14 years).

As described in Chapter 2.2 some countries even have statistical evidence concerning the age distribution of their used-vehicle exports / imports whereas the emission class, the composition according to motor type and size, the vehicle kilometres of the imported used cars or their economic value could hardly ever be provided. Accordingly a high level of uncertainty remains regarding these characteristics. However, in principle the national registration authorities should be able to provide such characteristics.

Recommendations for modelling parameters

- The approach of deriving scrappage rates simply from the national time series of a fleet breakdown, disregarding used-vehicle import / export, generates “polluted” scrappage rates. Therefore it is recommended to distinguish:
 - “national fleet exit rate” including scrappage and net import / export, possibly derived from national fleet data, and
 - “scrappage” rate considering effective scrappage only (e.g. due to breakdown, accident).
- Up to now the statistical information concerning the fleet composition and the related emissions on which the models build their predictions is rather uncertain. This uncertainty increases with each year that is forecast into the future. Thus for modelling purposes it is strongly recommended that the intervals between model updates with empirical data be reduced. A delay of five years and more is not appropriate.
- Regarding fleet data updates in the models the freely available international sources are found to be of limited reliability. Hence, one should refer to national sources to ensure appropriate quality. Commercial fleet data sources (e.g. <http://eu.polk.com/Products>) which are commonly used by the car industry might be an additional source but current licensing practices limit their free use.

Recommendations for European statistics

- The currently applied European data collection referring to age classes aggregating more than one year of age is not appropriate for investigations in fleet developments and evaluation of “fleet exit rates”.
- In particular the aggregates for older cars referring simply to ≥ 10 years is not

appropriate as for some countries the majority of imported cars is in this age class and the average (!) age for scrappage is reported to be 18 years.

- It is recommended that a data base / collection with a breakdown of at least (!) 16 age classes (a breakdown by single years of age up to ≤ 15 years, and one class > 15 years) be established.

Such a detailed breakdown should in any case be available to the national registration authorities and it is simply a question of aggregation and data management and to a smaller extent of data collection. Having such data at hand would enable the calculation of the “national fleet exit rate” as a function of vehicle age and time. By subtracting the average European scrappage rate (as derived by the methodology proposed in Chapter 2.3.4) from this “national fleet exit rate” a generic calculation of the net import can be performed. Even if this approach assumes a constant scrappage rate for all EU Member States it is suggested that it still provides a sufficient starting point to derive modelling parameters.

- Considering the current data situation it is a challenge to collect appropriate statistical information on characteristics (km, engine, emission class, value) of imported and exported used vehicles. Thus it is recommended to limit data collection to information concerning the age of the imported / exported used vehicles (and as far as possible the fuel type). Other characteristics shall be directly collected from the usage patterns connected with the age as described below. It might be more promising to collect such information by means other than statistics, as explained briefly at the end of the following section.

Usage patterns

- Data availability for usage patterns is poor. Although a very diverse group of respondents from different Member States were asked to fill in a questionnaire, very little data was collected. This was in particular the case when data was requested that allowed distinction of different vehicle ages, either in terms of years or vehicle kilometres. A number of elements can be identified that may help improving data collection and quality:
 - collection method
 - respondent groups
 - variable listings, including definitions.
- Suggestions can be grouped under the common denominator of providing a more standardised data collection structure. The German Mobility Study (2008) can be considered a good example for the collection of detailed mobility data and could provide an initial starting point for the creation of such a potential standardised structure. In addition, due to the continued introduction of the internet at household level, new opportunities arise for collecting mobility data.
- As far as the data that was collected in parallel to the questionnaire is concerned, two major findings could be identified:
 - in absolute terms, there are moderate to large differences between annual vehicle kilometres that are reported or found in different databases, projects or models. Therefore caution should be exercised when using these data. As a result of this, there is still a need for updated mobility data, collected through a carefully detailed and described methodology.

- In relative terms, it was found that the assumptions that are generally accepted in mobility models (a declining trend of annual vehicle kilometres, starting directly after purchase of a new vehicle) are not necessarily mirrored in real life mobility data (an increase in annual vehicle kilometres for the first 2 years and only after that period a decline).
- The findings show that further collection and evaluation of mobility data is needed in order to provide the emission models with the necessary input concerning driving patterns and vehicle characteristics.

6 References

- CARE, 2010 Community Road Accident Database, European Union, 2010.
- Datamonitor, 2009 Used cars in France; Datamonitor, 2009
- Eurostat, 2009a Quality Report on external trade statistics; Eurostat, Revised edition, 2009
- Eurostat, 2009b Illustrated Glossary of Transport Statistics, 4th Edition; Eurostat, 2009
- Eurostat / DG TREN, 2010: Energy and Transport in Figures, Part 3: Transport, 2010
- HIS, Global Insight, 2010: Assessment of the effectiveness of scrapping schemes for vehicles, prepared for EC DG Enterprise and Industry by HIS / Global Insight, March 2010
- KBA, 2008 Jahresbericht 2007; Kraftfahrtbundesamt, 2008
- MiD, 2010 Mobilität in Deutschland 2008; infas Institut für angewandte Sozialwissenschaft GmbH, Deutsches Zentrum für Luft- und Raumfahrt e.V. Institut für Verkehrsforschung; Berlin and Bonn, 2010
- FRS, 2009 Finish Road Statistics; Finish Road Administration, 2009
- FLEETS, 2008 LAT/AUTh, EnviCon, E3M-Lab/NTUA, Ökopol, KTI, Renault; European Database of Vehicle Stock for the Calculation and Forecast of Pollutant and Greenhouse Gases Emissions with TREMOVE and COPERT – Final Report, Thessaloniki, 2008
- TREMOVE, 2007 De Ceuster, G.; van Herbruggen, B.; Ivanova, O.; Carlier, K.; Martino, A.; Fiorello, D.: Service contract for the further development and application of the transport and environmental TREMOVE model Lot 1 (Improvement of the data set and model structure) - Final Report; TML, TRT, 2007; accessible via (last access 27th Jan 2011):
http://tremove.org/documentation/Final_Report_TREMOVE_9July2007c.pdf,
- TREMOD, 2010 Transport Emission Model TREMOD, Fortschreibung und Erweiterung "Daten- und Rechenmodell: Energieverbrauch und Schadstoffemissionen des motorisierten Verkehrs in Deutschland 1960-2030" (TREMOD, Version 5) - Endbericht; Institut für Energie- und Umweltforschung (IFEU), Heidelberg, 2010
- UBA, 2010 Verbleib der in Deutschland gelöschten PKW in 2008 (Whereabouts of German deregistered cars for 2008),
<http://www.umweltbundesamt-daten-zur-umwelt.de/umweltdaten/public/document/downloadImage.do?ident=18761>, last access 27th Jan 2011
- Vanherle et al., 2009 Vanherle, K. et al.: Modelling of the Impacts of Policies for Sustainable Use of Cars; Report by TML for the JRC, Seville, 2009

Annex 1: List of electronically available documents: literature and database

Literature related to the project aim as well as important data gathered in the course of the project are available electronically. A CD is attached to the hard copy of the report.

A Data

Eurostat's Transport Database

- ESTAT_Passenger cars, by age_100901.xls
- ESTAT_Passenger cars, by motor energy_100407.xls
- ESTAT_Passenger cars by unloaded weight_100407.xls
- ESTAT_New registrations of passenger cars by type of motor energy and engine size_100407.xls
- ESTAT_New registrations of passenger cars by unloaded weight_100407.xls
- ESTAT_Lorries, by age (number)_100408.xls
- ESTAT_Lorries, by load capacity (number)_100907.xls
- ESTAT_Lorries, by type of motor energy and load capacity_100408.xls
- ESTAT_New registrations of lorries, by load capacity (number)_100408.xls
- ESTAT_New registrations of lorries, by motor energy and load capacity (number)_100408.xls
- ESTAT_Modal split of passenger transport_100407.xls
- ESTAT_Volume of passenger transport_100407.xls
- ESTAT_Passenger road transport on national territory, by type of vehicles_100407.xls
- ESTAT_Motor vehicle movements on national territory, by vehicles registration_100704.xls
- ESTAT_Road traffic on national territory by type of vehicle and road_100408.xls
- ESTAT_Road traffic on national territory by type and age of vehicle (million VKm)_100408.xls

Eurostat's external trade statistics

- Comext_extra-EU27_passengercars_00-08.xls
- Comext_extra-EU27_lcv_00-08.xls⁹
- Comext_intra-EU27_passengercars_00-08.xls
- Comext_intra-EU27_lcv_00-08.xls

Eurostat: economic data (Consumption, Disposable Income, GDP)

⁹ Eurostat's definition of LCV is light commercial vehicles ≤ 5 t.

- Eurostat_Economic drivers 2005 2009.xls

Data from Associations as ACEA

- 20090407_2000_By_Country_Western_Europe.xls
- 20090407_2001_By_Country_Western_Europe.xls
- 20090407_2002_By_Country_Western_Europe.xls
- 20090407_2003_By_Country_Enlarged_Europe.xls
- 20090407_2004_By_Country_Enlarged_Europe.xls
- 20090407_2005_By_Country_Enlarged_Europe.xls
- 20090407_2006_By_Country_Enlarged_Europe.xls
- 20090407_2007_By_Country_Enlarged_Europe.xls
- 20091210_02_2008_vo_By_Country_Enlarged_Europe.xls
- 20100309_02_2009_vo_By_Country_Enlarged_Europe.xls
- 20100309_01_2010_vo_By_Country_Enlarged_Europe.xls
- ACEA_ANFAC_20080129_EU_Motor_Vehicles_in_Use_2006.pdf
- ACEA_ANFAC_20090218_EU_Motor_Vehicles_in_Use_2007.pdf
- ACEA_ANFAC_20100427_EU_Motor_Vehicles_in_Use_2008.pdf

Country Sources

- CZ_Fleet-entries+exits_2007_SDA-CIA.xls
- CZ_Fleet-entries+exits_2008_SDA-CIA.xls
- CZ_Fleet-entries+exits_2009_SDA-CIA.xls
- CZ_Fleet-entries+exits_half-2010_SDA-CIA.xls
- DE_KBA_Re-registrations_20100712.xls
- IT_IMPORTAZIONE AUTOVEICOLI USATI NUMERO E VALORE_MinTrans.xls
- IT_ESPORTAZIONE AUTOVEICOLI USATI NUMERO E VALORE_MinTrans.xls
- HU_used-vehicles-import_KTI_2010.xls
- Poland_Used-car-EXPORT+IMPORT_M1+N1_IntMin_100730.xls
- SK_imports_2005-2010_IntMin.xlsx
- SK_imports_2005-2010_IntMin-processing101011.xlsx

Modelling

- FleetBalance_PL+SK+CZ_101021.xls

B Literature

- ACEA_TaxGuide_2010.pdf
- Birekand_et_al_2001_Energy_Efficiency_of_Pas.pdf
- Dargay_etal_2005_The_dynamics_of_car_owne.pdf
- Dargay_etal_2006.pdf
- Eurostat_DGTREN_Energy-and-Transport-in-Figures_Part 3_2010.pdf
- Eskeland_etal_1994.pdf
- ESTAT Data in Focus 9-2010 Road traffic volumes 2008.pdf
- Eurostat etal Illustrated Glossary of Transport Statistics 4th edition 14 07 2009.pdf
- Final_Report_TREMOVE_9July2007c.pdf
- Fleets_Final_report.pdf
- Goldberg_etal_2000_pricedisp.pdf
- Haan_etal_2007_Policy_tools_influencing.pdf
- Hanly_Dargay_200x_PTRC2000.pdf
- Huang_2007_MPRA_paper_7086.pdf
- Hyman_etal_2002_An_econometric_investiga.pdf
- KBA_Jahresbericht2007_2008.pdf
- Kummer2009_AltfahrzeugsorgungEU.pdf
- Meurs_etal_2006_DYNAMO_dynamic_automobi.pdf
- MiD2010
- RDW_2008_The_Vehicle_Chain_in_Europe_2008_(Part I).pdf
- RDW_2008_The_Vehicle_Chain_in_Europe_2008_(Part II).pdf
- ScrappageSchemes_Effectiveness_FinalReport_2010.pdf
- ScrappageSchemes_Effectiveness_Annex-CountryProfiles_2010.pdf
- ScrappageSchemes_UK+OverviewEurope_2009.pdf
- TREMOD_Endbericht_IFEU_2010.pdf
- TRIPS 1999 13proj[1].pdf
- UBA (DE) 2008 whereabouts of passenger cars.pdf
- Verkehr-in-Zahlen_2010_Contents-de.pdf
- Z+F_2008_(deutsch) alles über den dt 1st and 2nd hand markt.pdf
- Z+F_2008_(English_key figures on German 1st and 2nd hand car market.pdf

C Literature (purchased) with limited circulation (reading access only)

- De_Jong_etal_1996.pdf
- De_Jong_etal_2004_comparison_ownership_models.pdf
- Fuse_etal_2009_used_automobiles.pdf
- Pendyala_etal_1994_evaluatio_of_car_ownership.pdf
- Datamonitor2009_Used-Cars-in-France.pdf

Annex 2: Detailed overview of contents and coverage of data sets from Eurostat's Transport Database

A) Passenger cars: Data sets potentially used for the description of cross border trade

Title: DS-073036-**Passenger cars, by age** (number)

Categories: < 2, 2-5, 5-10, > 10 years

Comment on coverage: data quite complete, fewer data for 2006 and 2007

Potential value: to be used to test the potential to conduct a derivation of import/export data in combination with data on "new registrations" and applying scrap function by lifetime and accidents only but this scrap function can not be derived from statistical data as approached in the FLEETS report.

Name of Eurostat's data base file: road_eqs_carage

File name at project database: ESTAT_Passenger cars, by age_100901.xls

Title: DS-073038-**Passenger cars, by motor energy**

Categories: Diesel < 1400cm³, 1400-2000cm³, > 2000cm³, total
All petroleum products < 1400cm³, 1400-2000cm³, > 2000cm³, total
Total (diesel + petroleum): total for all engine sizes only

Comment on coverage: breakdown by motor size incomplete, total for diesel and total for petrol: more coverage
When comparing the sum of diesel + petrol to the total in the motor category "total", quite good compliance is found; max +/- 5%, with a few higher deviations most likely by dimension mistakes or other reasons.

Electrical Energy, Electricity or other sources: no data

Potential value: see above

Name of Eurostat's data base file: road_eqs_carmot

File name at project database: ESTAT_Passenger cars, by motor energy_100407.xls

Title: DS-074593-**Passenger cars by unloaded weight**

Categories: < 1000 kg, 1000-1250 kg, 1250-1500 kg, > 1500 kg

Comment on coverage: only data for DK, EE, FR, LV, HU, AT, PL, FI, SE, HR, Ice, LI, NO, CH, are quite complete

Potential value: see above

Name of Eurostat's data base file: road_eqs_unlweig

File name at project database: ESTAT_Passenger cars by unloaded weight_100407.xls

Title: **DS-074589-New registrations¹⁰ of passenger cars by type of motor energy and engine size**

Categories: Diesel < 1400cm³, 1400-2000cm³, > 2000cm³, total
All petroleum products < 1400cm³, 1400-2000cm³, > 2000cm³, total
Total (diesel + petroleum): total for all engine sizes only

Comment on coverage: in the category "Total" for the fuel type no categorisation according to power is available; data show considerable voids, e.g. latest reporting year, completeness of supplied data, especially for BG, CZ, DK, IT, LU, PT, FR, GR, MT, CY, ES, IE, NL, RO, SK

Potential value: see above

Name of Eurostat's data base file: road_eqr_carm

File name at project database: ESTAT_New registrations of passenger cars by type of motor energy and engine size_100407.xls

¹⁰ A methodological request to Eurostat was submitted on 7th April 2010 to clarify if the term "new registrations" is the same as "first registration". Overall it was not certain whether the countries report new registrations of new cars or first registration (which might include imported cars firstly registered in the country). Based on the observation that the pocketbook published by DG.TREN and DG.ESTAT publish the data set of ACEA instead the data set of Eurostat, it was decided to approach accordingly for the purpose of this project.

A) Passenger cars: Data sets potentially used for the description of cross border trade

Title: **DS-074591-New registrations of passenger cars by unloaded weight**

Categories: < 1000 kg, 1000-1250 kg, 1250-1500 kg, > 1500 kg, **Total**

Comment on coverage: Comparable to **DS-074589-New registrations**; coverage most complete in category "Total"

Potential value: see above

Name of Eurostat's data base file: road_eqr_unlweig

File name at project database: ESTAT_New registrations of passenger cars by unloaded weight_100407.xls

B) Lorries: Data sets potentially used for the description of cross border trade

Title: **DS-073042-Lorries (and road tractors), by age (number)**

Categories: < 2, 2-5, 5-10, > 10 years, Total; no breakdown by weight!

Comment on coverage: from 2000 to 2007, data rather complete, fewer data for 2006 and 2007 (as for M1-vehicles); Data for road tractors were not downloaded as they do not belong to the scope of this study.

Potential value: to be used to test the potential to conduct a derivation of import / export data combining these data with data on "new registrations" ('road_eqr_lorria' and '', see below) and applying a scrap function by lifetime and accidents only. However, this scrap function cannot be derived from statistical data as done in the FLEETS project.

Unfortunately, the data do not distinguish different weight classes so that for extracting the number of lorries ≤ 3.5 t assumptions on their share among the total lorry fleet would have to be made (e.g. in combination with 'road_eqs_lorria', see below).

Name of Eurostat's data base file: road_eqs_lorria

File name at project database: ESTAT_Lorries, by age (number)_100408.xls

Title: **DS-073041-Lorries, by load capacity (number)**

Categories: Load capacity: < 1000 kg, < 5000 kg, ≥ 1000 kg and < 1500 kg, ≥ 1500 kg and < 3000 kg, ≥ 3000 kg and < 5000 kg, ≥ 5000 kg and < 7000 kg, ≥ 7000 kg and < 10000 kg, ≥ 10000 kg and < 15000 kg and ≥ 15000

Comment on coverage: from 2000 to 2007, data only interesting for the categories < 1500 kg, data quite complete with fewer data for 2006 and 2007

Potential value: in combination with 'road_eqs_lorria', see above

Name of Eurostat's data base file: road_eqs_lorria

File name at project database: ESTAT_Lorries, by load capacity (number)_100408.xls

Title: **DS-073040-Lorries, by type of motor energy and load capacity**

Categories:

Load capacity: ≥ 1500 kg, < 1500 kg, Total

Motor energy: Diesel, All petroleum products, Total; no data for the categories "Electrical energy", "Electricity or other sources" and "Other products"

Comment on coverage: from 2000 to 2007, data only interesting for the category < 1500 kg, data show gaps

Potential value: in combination with 'road_eqs_lorria', see above

Name of Eurostat's data base file: road_eqs_lorria

File name at project database: ESTAT_Lorries, by type of motor energy and load capacity_100408.xls

Title: **DS-073023-New registrations of lorries, by load capacity (number)**

Categories: Load capacity: < 1000 kg, < 5000 kg, ≥ 1000 kg and < 1500 kg, ≥ 1500 kg and < 3000 kg, ≥ 3000 kg and < 5000 kg, ≥ 5000 kg and < 7000 kg, ≥ 7000 kg and < 10000 kg, ≥ 10000 kg and < 15000 kg and ≥ 15000

Comment on coverage: from 2000 to 2007, data only interesting for the categories < 1500 kg, in these two categories no data for BE, BG, CZ, DK, GR, IT, LU, NL, RO, PT, UK, SK; data for other MS show some gaps;

Potential value: in combination with 'road_eqs_lorria', see above

Name of Eurostat's data base file: road_eqr_lorria

File name at project database: ESTAT_New registrations of lorries, by load capacity (number)_100408.xls

C) Data sets potentially used for the description of usage patterns or other purposes

Title: DS-074117-**Passenger cars per 1000 inhabitants (Indicator)**

Categories: n.a.

Comment on coverage: complete for EU27 until 2006;

Potential value: As the coverage regarding countries is better than the break down by years, motor type / size or unloaded weight these data might be used to complete the description of the entire fleet.

The rising rate for the period 2000 to 2006 differs between –1% for Austria and +53% for Latvia. These figures might be of interest in combination with GDP driven demand development.

Name of Eurostat's data base file: per inhab

File name at project database: ESTAT_Passenger cars per 1000 inhabitants_100407.xls

Title: DS-074161-**Volume of passenger transport (Indicator)**

Ratio between passenger-kilometres (pkm, inland modes) and GDP (chain-linked volumes, at 2000 exchange rates), 2000=100; includes transport by passenger cars, buses and coaches, and trains

Categories: n.a.

Comment on coverage: no data for CY, MT, otherwise quite complete
data based on "territoriality principle", regardless of nationality of vehicle

Potential value: as the coverage is better than other sources it might be used for additional completion.

Name of Eurostat's data base file: tran_hv_pstra

File name at project database: ESTAT_Volume+Modal split of passenger transport_100407.xls

Title: DS-073101-**Motor vehicle movements on national territory, by vehicles registration (in vkm)**

Categories: Numbers for passenger cars and Total

Coverage: Folder 1: registered in the reporting country: data very incomplete, no data for: BE, BU; CZ, IE, ES, IT, LU, AT, PL, PT, RO, SK, FI, UK, HR, YU, TR, LI

Folder 2: irrespective of registration country: data very incomplete, no data for: BU, DK, DE, ES, FR, IT, LU, NL, PL, PT, RO, SK, HR, YU, LI, NO

Potential value: for the time being background information only

Name of Eurostat's data base file: road_tf_vehmov

File name at project database: ESTAT_Motor vehicle movements on national territory, by vehicles registration_100704.xls (First folder)

Title: DS-073100-**Passenger road transport on national territory, by type of vehicles registered in the reporting country (in pkm)**

Categories:

Numbers for passenger cars and Total, data incomplete, no data for: BU, DE, GR, IT, LU, PL, PT, RO, SK, HR, YU, TR, LI

Potential value: for the time being background information only, potential use for usage patterns

Name of Eurostat's data base file: road_pa_mov

File name at project database: ESTAT_Passenger road transport on national territory_100407.xls

Title: DS-074160-**Modal split of passenger transport**

Categories: percentage of each mode (passenger cars, buses and coaches, and trains), in total inland passenger transport performance measured in passenger-km

no data for CY, MT, YU, otherwise quite complete

Potential value: for the time being background information only, potential use for using patterns

Name of Eurostat's data base file: tran_hv_pstra

File name at project database: ESTAT_Motor vehicle movements on national territory, by vehicles registration_100704.xls (Second folder)

Annex 3: List of national experts approached in the study

Key:

* contact provided by DG Climate Action (Marek STURC).

** via EReg-homepage.

Xo : 1st questionnaire: no response

X- : 1st questionnaire: negative answer (sometimes naming other contacts) / 2nd questionnaire: no data made available

X+ : 1st questionnaire: positive answer / 2nd questionnaire: data made available (via questionnaire or else)

Country	Institution	1 st Quest	2 nd Quest
Austria	Licensing authority (from Vehicle Chain Report, 2008): Verband der Versicherungsunternehmen Österreichs (VVO)	X-	X-
	Austrian Environmental Protection Agency (EPA)	X+	X-
	Wirtschaftskammer Österreich / Austrian Automotive Industry Association - Fachverband der Fahrzeugindustrie Österreichs (FFOE)	X-	---
	Wirtschaftskammer Österreich / Vehicle Trade - Fahrzeughandel	Xo	X-
	Porsche Austria, Weltauto	X+	X-
	BMW Austria	Xo	X-
	Statistik Austria	Xo	X-
	EurotaxGlass's	---	X-
Belgium	Institut Bruxellois pour la gestion de l'environnement	Xo	---
	Direction générale opérationnelle – Aménagement du territoire, logement, patrimoine et energie	Xo	---
	VITO	Xo	---

Country	Institution	1 st Quest	2 nd Quest
	FEBIAC*	Xo	X-
	FOD Mobiliteit en Vervoer*	Xo	X-
Bulgaria	Ministry of transport, information technology and communications	Xo	X-
	Association of Car Manufacturers and their Authorized Representatives for Bulgaria (ACM / SVAB)	Xo	---
Cyprus	Department of labour inspection (DLI) / Ministry of labour and social insurance (MLSI)	X+	X-
	Department of Road Transport**	Xo	X-
	Cyprus Employers and Industrialists Federation (OEB)	Xo	---
Czech Rep.	CDV - Transport Research Centre	X-	---
	Ministry of Industry and Trade (MPO)	X+	X-
	Ministry of Transport / Road Traffic	---	X+
	AAA Auto Group (CZ)	Xo	X-
	AIA CR (SAP) – Automotive Industry Association of the Czech Republic	Xo	X-
	Car Importers Association (SDA)	---	X+
Denmark	Aarhus University, National Environmental Research Institute (DMU)	X+	X-
	Road Safety and Transport Agency*	Xo	X-
	Technical University of Denmark (DTU) Transport	Xo	X+
	Danish Tax and Customs Administration - SKAT	---	X+

Country	Institution	1 st Quest	2 nd Quest
Estonia	Estonian Environment Information Centre, Ministry of the Environment	X+	X+
	Estonian Motor Vehicle Registration Centre (ARK)**	Xo	X+
	Union of Estonian Car Sales and Service Enterprises (AMTEL)	Xo	---
	Estonian Road Administration	Xo	X-
	Estonian Tax and Customs Board	Xo	X-
Finland	Environmental Administration, Ministry of the Environment	Xo	---
	Finnish Transport Safety Agency, Vehicle Administration (AKE)*	X+	X-
	VTT Technical Research Centre of Finland	Xo	X-
	Autoalan keskusliitto ry	Xo	X-
	AUTOTUOJAT ry	X+	X+
	Ministry of Transport and Communications*	X+	X-
France	Association Auxiliaire de l'Automobile*	Xo	---
	National Reference Centre on Air Emissions (CITEPA)	X-	---
	Ministry of Interior**	Xo	X-
	Comité des Constructeurs Français d'Automobiles (CCFA)	Xo	X-
	National research institute about transport and transport safety (INRETS)	Xo	X-
	Ministry of Environment (Meeddm/CGDD/SOeS)*	X+	X+
	Union Technique de l'Automobile, du motorcycle et du Cycle (UTAC)*	Xo	---
Germany	German EPA	X-	---

Country	Institution	1 st Quest	2 nd Quest
	Federal Motor Transport Authority (KBA)	X-	---
	Federal Motor Transport Authority (KBA) in charge for REGINA		X+
	TÜV Nord Mobilität	X-	---
	German Car Manufacturers' Association (VDA)	Xo	---
	BMW Group*	Xo	---
	Ministry of Transport, Building and Urban Development*	Xo	X-
	Ministry of Environment*	Xo	---
	Transport&Environment (T&E)*	X+	X-
	IFEU-Institut	X+	X+
	Oekopol*	X+	X-
	German Aerospace Center (DLR)	---	X-
	Citroën	---	X+
	Öko-Institut	---	X+
Greece	EDPP	Xo	---
	Association of Motor Vehicle Importers-Representatives (AMVIR (SEAA))	Xo	X-
Hungary	Institute for Transport Sciences (KTI)	X+	X+
	Central Office for Administrative and Electronic Public Services**	Xo	X-
	Association of the Hungarian Automotive Industry (MGSZ)	X-	---
	Hungarian Vehicle Importers Association (MGE)	Xo	X-

Country	Institution	1 st Quest	2 nd Quest
Ireland	Irish EPA	X+	X+
	Department of the Environment*	X+	X-
	Department of Transport**	Xo	X-
	Revenue Commissioners, Vehicle Registration Branch	X+	X+
	Society of the Irish Motor Industry (SIMI)	---	X+
Italy	Instituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA)	Xo	---
	Ministry of Infrastructure and Transport*	X+	X+
	Ministry of Environment*	Xo	---
	Automobile Club d'Italia	Xo	---
Latvia	Latvian Environment, Geology and Meteorology Centre	Xo	X-
	Latvian Authorized Automobile Dealers Association (LAADA)	Xo	---
	Perm. Rep. of Latvia to EU (Transport Attaché)*	Xo	X-
	Ministry of Transport*	Xo	---
Lithuania	State Enterprise REGITRA**	X-	---
	Lithuanian Autoentrepreneurs Association(LAA)	Xo	---
Luxembourg	EPA Luxembourg	Xo	X-
	Transport Department, Ministry for Sustainable Development and Infrastructure	---	X-

Country	Institution	1 st Quest	2 nd Quest
Malta	Malta Environment and Planning Authority	X-	---
	Malta Transport Authority (ADT)**	Xo	---
Netherlands	Netherlands Environmental Assessment Agency	Xo	---
	Centre for Vehicle Technology and Information (RDW)*	X+	X+
	De Rijwiel en Automobiel Industrie Vereniging (RAI)	Xo	---
	NAP Foundation/ RAI	---	X-
	EVO*	Xo	---
	Ministry of Environment (MINVROM)*	Xo	---
Poland	Institute for Ecology of Industrial Areas	Xo	---
	Ministry of Infrastructure, Department of Road Transport**	Xo	X-
	Ministry of the Interior and Administration, Department for State Registers and ICT*	X+	X+
Portugal	Universidade Nova de Lisboa, Faculty of Science and Technology	Xo	---
	Instituto da Mobilidade e dos Transportes Terrestres**	Xo	X-
	Portuguese Car Trade Association (ACAP)	Xo	X-
Romania	Romanian EPA	Xo	---
	Romanian Automotive Register (RAR)**	X+	X-
	Ministry of Interior**	Xo	X-
	Romanian Car Manufacturers Association (ACAROM)	Xo	---

Country	Institution	1 st Quest	2 nd Quest
	Ministry of environment and sustainable development*	Xo	---
Slovakia	Slovensky Hydrometeorologicky Ustav (SHMU)	Xo	---
	Automotive Industry Association SR (ZAPSR)	X+	X-
	Ministry of Interior	---	X+
Slovenia	Slovenian EPA	X+	X-
	Interior Ministry, Licensing authority	Xo	X-
	Ministry of Transport**	X-	---
	Ministry of the Environment and Spatial planning*	X+	X-
	Association of Automobile Manufacturers and Authorised Importers (ADS)	X-	---
Spain	Consultant under contract to Ministry of Environment (in 2003)	Xo	---
	Spanish Automobile and Lorries Manufacturers' Association (ANFAC)	Xo	X-
	Ministry of Environment*	X-	---
	National Association of motor vehicle sellers, repair and replacement (GANVAM)	Xo	X-
	Ministry of Industry, Tourism and Trade*		---
	Traffic Authority (DGT) – Interior Ministry*	X+	X+
Sweden	Swedish Road Administration (Trafikverket)	Xo	X-
	Swedish Transport Agency (Transportstyrelsen)**	X+	X+
	BIL Sweden	Xo	---

Country	Institution	1 st Quest	2 nd Quest
United Kingdom	Driver & Vehicle Agency	Xo	X-
	Society of Motor Manufacturers and Traders (SMMT)*	X+	X-
	Department for Transport*	X+	X+
Europe	EUCARIS	Xo	---
	ACEA	Xo	X-
	College of Europe*	Xo	---
	European Commission, Eurostat	X+	X+
	The Association of European Vehicle Logistics (ECG)	Xo	---
	Greenpeace (European Unit)	Xo	---
	CLEPA – Lobby of the European Automotive Supply Industry*	Xo	---
	Fédération Internationale de l'Automobile (FIA)*	Xo	---
Extra-EU 27	BIL - Bilimportørenes Landsforening	Xo	---
	Norwegian Public Roads Administration*	Xo	X-
	GLOBAL INSIGHT*	Xo	---
	Japan Automobile Manufacturers' Association (JAMA) - European Office*	Xo	---
	International Council on Clean Transportation (ICCT)*	X+	X-
	International Council on Clean Transportation (ICCT)*	X+	X-
Car Companies	Daimler*	Xo	---

Country	Institution	1 st Quest	2 nd Quest
	Fiat*	Xo	---
	Ford*	Xo	---
	Hyundai*	Xo	---
	PSA Peugeot, Citroën*	Xo	---
	RENAULT*	Xo	---
	Volvo Truck Corporation*	X+	X-

Key:

* contact provided by DG Climate Action (Marek STURC).

** via EReg-homepage.

Xo : 1st questionnaire: no response

X- : 1st questionnaire: negative answer (sometimes naming other contacts) / 2nd questionnaire: no data made available

X+ : 1st questionnaire: positive answer / 2nd questionnaire: data made available (via questionnaire or else)

Annex 4: Questionnaires I and II

Questionnaire I was issued in three languages (EN, FR, DE), the intention being to ask possible experts whether they are willing to contribute to a comprehensive survey and in order to broaden the base of contacts in May and June 2010. Questionnaire II (in English only) encompasses the questions of the subsequent comprehensive survey issued in July 2010.

Questionnaire I

1. A comprehensive questionnaire shall be issued in June regarding:
 - a. cross border trade (import / export) of used cars and
 - b. usage patterns of used cars (e.g.: mileage per year in dependence of age or vehicle type)

The average time required to complete the questionnaire is expected not to exceed 30 minutes.

Are you willing to provide your knowledge to such questionnaire?

(please check the appropriate box)

2. We are looking to complete the list of experts and thus looking for additional experts (e.g. officers of national agencies / authorities, scientists or other stakeholders of associations) in the field of:
 - a. cross border trade (import / export) of used cars and
 - b. usage patterns of used cars (e.g.: mileage per year in dependence of age or vehicle type)

Could you kindly recommend other national / international experts in these fields which we should ask to contribute?

(please check the appropriate box)

3. We are interested in sources / information / data / publications on:
 - a. cross border trade of used cars (Passenger cars [M1] and light utility vehicles [N1]) and their characteristics (age, mileage, type)
 - b. usage patterns of used cars
 - i. average annual mileage by age /and fuel type

- ii. driving patterns (urban – rural – highway shares (simple overall share)
- iii. occupancy rates (simple overall share)
- iv. engine size (or power) / emissions
- v. accident statistics and other parameters influencing the lifetime
- vi. lifetime functions / scrappage functions
- vii. segment differentiation (premium cars vs. cheap cars)
- viii. vehicle prices
- ix. company cars purchases (how many new cars are purchased as company cars and their re-sale patterns compared to privately owned vehicles)

4. Could you kindly recommend related sources (other than Eurostat, ACEA, TREMOVE)?

(please check all that apply)

Thank you very much for your contribution.

During the 4th quarter of 2010 a conference is envisaged, where the gathered information will be presented and discussed. The event will be announced in due time and we would appreciate your attendance. In case you are prevented by any reason, you, as a supporter, will have primary access to these presentations. In addition it is envisaged to disseminate the final report early next year.

Questionnaire II

SECTION A: Cross-border trade of used cars

The first part of this section refers to the export of used cars into other European countries. The second part provides the same questions for the import. If you only have information on usage patterns you can skip Section A by checking “no” for export and import (A1. and A2.). The questions are always answered with yes or no; depending on your answer (the degree of detail, in which you have data available) a table then pops up where you can introduce the numbers (either M1 and N1 separately or M1&N1 combined). Alternatively, there is also an option to upload corresponding documents (for cases where this option is not offered directly beneath the question there is a general upload possibility at the end of each section).

For all data you need indicate the source by checking

- National statistics
- Companies / association statistics
- Other empirical data (surveys, research, others)
- Best guess

and the year:

- 2005; 2006; 2007; 2008; 2009;

and sometimes also the unit.

Export of used cars

A 1) Can you provide an estimate or data on the numbers of the **exported used** passenger cars (M1) and light utility vehicles (N1) from your country? y/n

More specifically:

A 1.1) Can you distinguish by countries of **destination**? y/n

A 1.2) Can you differentiate the numbers of the exported used passenger cars (M1) and light utility vehicles (N1) **by age** for the following categories? y/n
≤2 years; >2years ≤5 years; >5 years ≤10 years; >10 years

A 1.3) Can you differentiate the numbers of the **exported used** passenger cars (M1) and light utility vehicles (N1) **by mileage** for the following categories? y/n
≤10 000 km; >10 000 km ≤50 000 km; >50 000 km ≤100 000 km; >100 000 km

A 1.4) Can you differentiate the numbers of the **exported used** passenger cars (M1) and light utility vehicles (N1) by type of fuel and size of engine for the following categories? y/n

- a) Diesel <2 litre; b) Diesel >2 litre; c) Petrol <1.4 litre; d) Petrol >1.4 litre <2 litre;
- e) Petrol >2 litre f) others

A 1.5) Can you differentiate the numbers of the exported used passenger cars (M1) and light utility vehicles (N1) by purchase price for the following categories? y/n
<1000 €; >1000 € ≤ 2500 €; >2500 ≤5000 €; >5000 €

Import of used cars

A 2) Can you provide an estimate or data on the numbers of the **imported used** passenger cars (M1) and light utility vehicles (N1) from your country? *y/n*

More specifically:

A 2.1) Can you distinguish by countries of **origin**? *y/n*

A 2.2) Can you differentiate the numbers of the **imported used** passenger cars (M1) and light utility vehicles (N1) **by age** for the following categories? *y/n*
 ≤ 2 years; > 2 years ≤ 5 years; > 5 years ≤ 10 years; > 10 years

A 2.3) Can you differentiate the numbers of the **imported used** passenger cars (M1) and light utility vehicles (N1) **by mileage** for the following categories? *y/n*
 $\leq 10\,000$ km; $> 10\,000$ km $\leq 50\,000$ km; $> 50\,000$ km $\leq 100\,000$ km; $> 100\,000$ km

A 2.4) Can you differentiate the numbers of the **imported used** passenger cars (M1) and light utility vehicles (N1) **by type of fuel and size of engine** for the following categories? *y/n*

a) Diesel ≤ 2 litre; b) Diesel > 2 litre; c) Petrol ≤ 1.4 litre; d) Petrol > 1.4 litre ≤ 2 litre; e) Petrol > 2 litre f) others

A 2.5) Can you differentiate the numbers of the **imported used** passenger cars (M1) and light utility vehicles (N1) **by purchase price** for the following categories? *y/n*
 ≤ 1000 €; > 1000 € ≤ 2500 €; > 2500 € ≤ 5000 €; > 5000 €

A 3) This field and upload possibility are for further comments you would like to let us know (p.ex. future availability of data, imminent changes in reporting schemes, other contact persons in this field, etc.).

→ Text-Field for free comments.

→ Field for upload of other documents

Following Section A you can either continue with the next Section B on usage patterns, or choose to skip this section and continue with the last Section C on instruments possibly influencing the market.

SECTION B: Usage patterns of used cars

Usage patterns: questions are currently asked for all cars since it is unlikely that distinctions between used cars and new cars will be made. If you can report or guess on differences please do not hesitate to share this knowledge by providing it at the end of this section via the designated field.

B 1) Can you provide an estimate or data on the **average total mileage or the yearly mileage** for passenger cars (M1) and light utility vehicles (N1)?

B 1.1) Can you provide these data in dependence of the age of the car?

B 2) Can you provide an estimate or data on the **average age** for passenger cars (M1) and light utility vehicles (N1) in dependence of **the total mileage** of the vehicle?

- B 3) Can you provide an estimate or data **on the purchase price (average selling price)** of a passenger car (M1) or light utility vehicle (N1) for different motor sizes (categories: ≤1400 cc; >1400 cc .. ≤ 2000 cc; > 2000 cc)?
- B 4) Can you provide an estimate or data on the **proportions of yearly mileages** driven in dependence of **the age** of the vehicle, for passenger cars (M1) and light utility vehicles (N1)? Note: 100% is total of all cars within the assigned vehicle category (M1, N1 or M1&N1), over mileages and ages.
- => two-dimensional matrix with:
- categories of yearly mileages: ≤ 5000 km; > 5000 km .. ≤ 10000 km;
> 10000 km .. ≤ 30000 km; > 30000 km
- categories of age: ≤ 2 yrs; > 2 yrs .. ≤ 5 yrs; > 5 yrs .. ≤ 10 yrs; > 10 yrs
- B 5) Can you provide an estimate or data on the **yearly mileage driven on different road types** for passenger cars (M1) and light utility vehicles (N1)? The information might be expressed in percent¹¹ over road types and ages or as total mileage driven per year.
- B 5.1) Can you provide these data in dependence of the age of the car?
- B 6) Can you provide an estimate or data on the **vehicle occupancy rate** for passenger cars (M1) and light utility vehicles (N1)?
- B 6.1) Can you provide this data in dependence of the age of the car?
- B 7) Can you provide an estimate or data on the **number of fatal accidents** for passenger cars (M1) and light utility vehicles (N1)? Note: the number of fatal accidents is not the same as the number of fatalities. The number of fatal accidents equals the number of accidents where one or more fatalities happened. Each accident only counts as one, independent of the number of fatalities in the accident.
- B 7.1) Can you provide these data in dependence of the age of the car?
- B 8) This field and upload possibility are for further comments you would like to let us know (p.ex. future availability of data, imminent changes in reporting schemes, other contact persons in this field, etc.).

Section C: Policies, regulations and measures influencing the car market

In some cases, external influences can be identified that alter the choice of potential vehicle owners between buying a new car or a second-hand car. This is for example the case with feebate schemes (getting a reduction for buying a new, more environmentally friendly car, under the condition that an older, less environmentally friendly car is scrapped), taxation and VAT differences, but also marketing schemes by car companies. Can you identify important measures in your country that potentially affected this choice? And, if so, can you provide information on the results of these measures (for example: reference to report indicating an increase/decrease in the number of vehicles sold)? This result should be linked directly to the measure.

* Measure type (feebate, taxation, marketing, etc.)

¹¹ Note: 100% is total of all cars within the assigned vehicle category (M1, N1 or M1&N1),

- * Indication of result (more new and 2nd hand vehicles sold, less new and 2nd hand vehicles sold, more new but less 2nd hand vehicles sold, less new but more 2nd hand vehicles sold)
 - * Reference (hyperlink or added document)
 - * Starting and end year of the measure
-

Annex 5: Estimation of the minimum import / export numbers of used vehicles

Estimated relevance of import for M1 for the yxear 2008

= reported by reporter
= reported by exporting partner

0.15 Threshold 1
0.30 Threshold 2
0.60 Threshold 3

	ESTAT: Intra EU-27 import		German Export			Other sources	Estimated minimum intra EU-27 Import	Change compared to import reported by reporter	Extra EU-27 import	New Registrations	Import / NewReg	Import (incl. extraEU) / NewReg
	Reported by reporter	Reported by exporting partner	De-registration (KBA), share M1	ESTAT: Reported by German Statistics	ESTAT: Reported by importing partners							
source	1)	2)	3)	1)	2)	4)			6)	5)		
AT	30 251	25 221	2 503	14 158	16 711		30 251	1.0	1410	293 697	10%	11%
BE	58 377	152 320	20 284	9 835	10 165		162 769	2.8	4290	535 947	30%	31%
BG	70 727	10 580	74 421	2 756	5 104		140 044	2.0	12073	43 758	320%	348%
CY	7 565	3 614	1	120	57		7 565	1.0	14521	24 000	32%	92%
CZ	46 364	28 122	152 775	10 490	15 155	0 a)	183 984	4.0	2513	182 554	101%	102%
DE	95 273	153 034				169 407 b)	169 407	1.8	52018	3 090 040	5%	7%
DK	4 298	5 296	9 734	3 530	3 522	40 001 c)	40 001	9.3	851	150 144	27%	27%
EE	2 998	3 540	11 264	1 616	2 035	11 089 d)	13 188	4.4	2133	24 579	54%	62%
ES	24 047	30 111	21 224	22 011	21 089		30 111	1.3	8293	1 161 176	3%	3%
FI	2 372	3 134	15 908	2 258	1 622	22 574 e)	22 574	9.5	2530	139 611	16%	18%
FR	68 177	94 007	890	20 249	17 121		94 007	1.4	5510	2 050 282	5%	5%
GR	58 949	4 114	891	3 481	52 741		58 949	1.0	638	267 295	22%	22%
HU	1 311	15 459	18 339	8 018	162		25 780	19.7	186	153 278	17%	17%
IE	1 646	11 168	29	37	134	50 000 f)	50 000	30.4	3011	151 607	33%	35%
IT	39 704	58 898	22 922	43 534	23 926	39 733 g)	58 898	1.5	3038	2 161 679	3%	3%
LT	238 959	19 782	53 873	2 555	104 954		238 959	1.0	44208	22 217	1076%	1275%
LU	11 175	11 677	6 447	2 713	2 731		15 411	1.4	39	52 359	29%	30%
LV	2 657	5 974	32 036	1 427	1 909		36 583	13.8	2774	19 831	184%	198%
MT	230	767	1	31	1		767	3.3	2778	5 000	15%	71%
NL	8 868	22 405	51 232	11 977	4 044	78 000 h)	78 000	8.8	8011	499 918	16%	17%
PL	36 670	56 228	624 807	22 845	16 032	1 009 287 i)	1 009 287	27.5	36621	320 040	315%	327%
PT	746	10 496	446	3 533	397		10 496	14.1	284	213 389	5%	5%
RO	11 598	31 574	185 687	19 426	7 811		197 835	17.1	950	270 995	73%	73%
SE	420	1 194	7 465	951	152	21 000 j)	21 000	50.0	7968	253 982	8%	11%
SI	17 558	14 262	194	2 397	1 322		17 558	1.0	292	71 575	25%	25%
SK	4 829	13 320	24 311	3 691	2 525	95 272 k)	95 272	19.7	2741	70 040	136%	140%
UK	8 271	3 569	1 540	685	1 263		8 548	1.0	21727	2 131 795	0%	1%
										14 360 788		

1)	EUROSTAT - Comext (intraEU) for used motor cars and other vehicles principally designed for the transport of persons (CN8: 87032190, 87032290, 87032390, 87032490, 87033190, 87033290, 87033390) - reported by reporter
2)	EUROSTAT - Comext (intraEU) for used motor cars and other vehicles principally designed for the transport of persons (CN8: 87032190, 87032290, 87032390, 87032490, 87033190, 87033290, 87033390) - reported by partner (mirror value)
3)	German KBA - Re-registration data outside Germany / German Export
4)	Expert data from survey on European 2nd hand car market, conducted by Öko-Institut, TML, COWI (2010)
5)	ACEA -New Registrations (http://www.acea.be/index.php/news/news_detail/new_vehicle_registrations_by_country/); MT and CY: TREN / Eurostat: Energy and Transport in figures 2010 (Pocketbook)
6)	EUROSTAT - Comext (extraEU) IMPORT for used motor cars and other vehicles principally designed for the transport of persons (CN8: 87032190, 87032290, 87032390, 87032490, 87033190, 87033290, 87033390)

a)	Downloads from SDA-CIA
b)	German KBA (estimated as 95% of M1+N1; percentage taken from extra-EU-import as reported by Comext)
c)	Danish Customs SKAT (estimated as 95% of M1+N1; percentage taken from extra-EU-import as reported by Comext)
d)	Estonian Motor Vehicle Registration Centre ARK (value for 2009)
e)	AUTOTUOJAT ry
f)	approximate value from data given by national experts (Irish EPA, Revenue Commissioner-Vehicle Registration Branch, SIMI)
g)	Italian Ministry of Transport / Italian Customs
h)	Dutch RDW
i)	Polish Ministry of Interior
j)	Swedish Transport Agency (values for 2008)
k)	Slovak Ministry of Interior

Estimated relevance of export for M1 for the year 2008

= reported by reporter
= reported by exporting partner

0.15 Threshold 1
0.30 Threshold 2
0.60 Threshold 3

source	ESTAT: Intra EU-27 Export		Polish Import		German Import			Other sources	Estimated minimum intra EU-27 Export	Change compared to export reported by reporter	Extra EU-27 export	ACEA New Registrations	Export / NewReg	Export (incl. EU Extra) / NewReg	
	Reported by reporter	Reported by importing partner	Polish Import	ESTAT: Reported by polish statistics	ESTAT: Reported by exporting partners	Re-registration (KBA), share M1	ESTAT. Reported by German statistics								ESTAT: Reported by exporting partners
1)	2)	3)	1)	2)	4)	1)	2)	5)	6)	7)	6)				
AT	30 518	18 208	23 530	533	2 948	13 078	6 212	6 290		57 888	1.9	7 111	293 697	20%	22%
BE	83 365	64 960	76 532	4 500	8 843	15 490	14 074	20 112		146 432	1.8	189 671	535 947	27%	63%
BG	98	68	40	5	1	126	8	16		247	2.5	1 078	43 758	1%	3%
CY	4	23	52	0	0	0	0	0		75	18.8	40	24 000	0%	0%
CZ	722	1 150	541	46	65	1 579	264	41	0 a)	2 960	4.1	2 821	182 554	2%	3%
DE	214 324	312 685	621 911	16 032	22 845	0	0	1 339 223 b)		1 339 223	6.2	243 091	3 090 040	43%	51%
DK	14 779	11 189	9 610	355	452	4 107	2 382	9 954	36 169 c)	36 169	2.4	1 754	150 144	24%	25%
EE	623	1 627	171	21	37	142	42	30		1 877	3.0	2 682	24 579	8%	19%
ES	228 834	84 667	4 703	539	2 336	47 874	38 321	57 381	145 363 d)	228 834	1.0	5 792	1 161 176	20%	20%
FI	92	891	148	0	0	70	3	0		1 106	12.0	336	139 611	1%	1%
FR	85 143	129 482	93 568	8 524	10 026	30 024	18 474	28 186	118 208 e)	226 076	2.7	25 292	2 050 282	11%	12%
GR	55	117	58	0	0	192	11	17		356	6.5	134	267 295	0%	0%
HU	656	1 216	116	51	81	405	659	374		1 216	1.9	948	153 278	1%	1%
IE	18	429	201	2	0	74	0	0		702	39.0	81	151 607	0%	1%
IT	47 684	145 397	97 279	3 689	2 590	33 081	7 997	12 448	47 684 f)	264 071	5.5	20 594	2 161 679	12%	13%
LT	8 690	434	878	142	3 574	298	102	196		8 690	1.0	238 851	22 217	39%	1114%
LU	19 423	9 587	4 817	278	301	7 721	1 075	4 314		27 346	1.4	1 044	52 359	52%	54%
LV	261	563	47	5	6	411	218	75		798	3.1	1 541	19 831	4%	12%
MT	1	112	1	0	0	4	67	0		112	112.0	13	5 000	2%	3%
NL	15 696	32 370	58 946	1 455	608	7 717	2 941	11 215	205 000 g)	205 000	13.1	53 728	499 918	41%	52%
PL	185	2 610	0	0	0	1 554	215	30	6 013 h)	6 013	32.5	27 024	320 040	2%	10%
PT	26	1 832	38	0	0	1 095	602	0		2 363	90.9	3 514	213 389	1%	3%
RO	182	373	20	17	1	181	87	54	44 189 i)	44 189	242.8	50	270 995	16%	16%
SE	944	4 602	5 559	54	79	1 053	766	40		10 394	11.0	5 421	253 982	4%	6%
SI	2 374	988	103	1	6	6	300	1 379		2 374	1.0	37 993	71 575	3%	56%
SK	425	689	138	3	120	169	66	4		927	2.2	134	70 040	1%	2%
UK	34 798	26 257	10 192	418	1 309	2 962	387	878		45 765	1.3	22 001	2 131 795	2%	3%

1)	EUROSTAT - Comext (intraEU) for used motor cars and other vehicles principally designed for the transport of persons (CN8: 87032190, 87032290, 87032390, 87032490, 87033190, 87033290, 87033390) - reported by reporter
2)	EUROSTAT - Comext (intraEU) for used motor cars and other vehicles principally designed for the transport of persons (CN8: 87032190, 87032290, 87032390, 87032490, 87033190, 87033290, 87033390) - reported by partner (mirror value)
3)	Polish Ministry of Interior and Administration, Import data
4)	German KBA - Re-registration data within Germany / German Import
5)	Expert data from survey on European 2nd hand car market, conducted by Öko-Institut, TML, COWI (2010)
6)	ACEA - New Registrations (http://www.acea.be/index.php/news/news_detail/new_vehicle_registrations_by_country/); MT and CY: Energy and Transport in figures 2010 (Pocketbook)
7)	EUROSTAT - Comext (extraEU) - EXPORT for used motor cars and other vehicles principally designed for the transport of persons (CN8: 87032190, 87032290, 87032390, 87032490, 87033190, 87033290, 87033390)

a)	Downloads from SDA-CIA
b)	German KBA (estimated as 89% of M1+N1; percentage taken from extra-EU-import as reported by Comext)
c)	Danish Customs SKAT (estimated as 70% of M1+N1; percentage taken from extra-EU-import)
d)	Spanish DGT
e)	from ELV-reporting
f)	Italian Ministry of Transport / Italian Customs
g)	Dutch RDW
h)	Polish Ministry of Interior
i)	Swedish Transport Agency (values for 2009)

Estimated relevance of import for N1 for the yxear 2008

= reported by reporter
= reported by exporting partner

0.15 Threshold 1
0.30 Threshold 2
0.60 Threshold 3

source	ESTAT: Intra EU-27 import		German Export			Other sources	Estimated minimum intra EU-27 Import	Change compared to import reported by reporter	Extra EU-27 import	New Registrations	Import / NewReg	Import (incl. extraEU) / NewReg
	Reported by reporter	Reported by exporting partner	De-registration (KBA), share N1	ESTAT: Reported by German Statistics	ESTAT: Reported by importing partners							
	1)	2)	3)	1)	2)	4)			6)	5)		
AT	552	802	309	514	466		802	1.5	71	32 763	2%	3%
BE	1 800	3 088	2 507	272	252		5 323	3.0	987	67 546	8%	9%
BG	3 185	1 331	9 198	417	1 020		11 363	3.6	986	11 478	99%	108%
CY	1 344	534		1	0		1 344	1.0	1 055	4 444	30%	54%
CZ	2 284	1 537	18 882	596	1 224	12 539 a)	19 942	8.7	17	20 269	98%	98%
DE	4 398	6 699		0	0	8 916 b)	8 916	2.0	2 308	223 525	4%	5%
DK	123	309	1 203	100	110	2 105 c)	2 105	17.1	43	33 602	6%	6%
EE	348	273	1 392	32	84	526 d)	1 656	4.8	77	2 976	56%	58%
ES	48 278	206	2 623	47	32		50 869	1.1	42	165 872	31%	31%
FI	164	271	1 966	205	82		2 048	12.5	100	16 395	12%	13%
FR	3 973	920	110	135	220		3 973	1.0	122	458 937	1%	1%
GR	338 609	2 048	110	781	166 981		338 609	1.0	10	22 205	1525%	1525%
HU	74	734	2 267	181	35		2 820	38.1	32	21 559	13%	13%
IE	128	2 036	4	4	0	6 000 e)	6 000	46.9	13	28 163	21%	21%
IT	1 063	1 994	2 833	798	536	5 338 f)	5 338	5.0	349	223 885	2%	3%
LT	8 377	3 634	6 658	154	1 559		13 476	1.6	335	3 000	449%	460%
LU	674	382	797	142	220		1 251	1.9	0	4 028	31%	31%
LV	237	292	3 960	101	143		4 151	17.5	16	2 041	203%	204%
MT	120	79		1	0		120	1.0	520	666	18%	96%
NL	3 833	2 913	6 332	933	1 480	14 000 g)	14 000	3.7	160	84 654	17%	17%
PL	20 962	12 374	77 223	4 720	8 466	96 328 h)	96 328	4.6	1 797	55 896	172%	176%
PT	65	214	55	15	1		254	3.9	16	55 398	0%	0%
RO	1 568	2 954	22 950	1 416	1 022		24 488	15.6	34	36 414	67%	67%
SE	207	170	923	78	94	3 000 i)	3 000	14.5	470	39 269	8%	9%
SI	786	2 387	24	62	74		2 387	3.0	12	7 282	33%	33%
SK	1 985	452	3 005	209	122	5 919 j)	5 919	3.0	16	26 900	22%	22%
UK	115	104	190	24	1		304	2.6	373	287 158	0%	0%

1)	EUROSTAT - Comext (intraEU) for used motor vehicles <= 5t for the transport of goods (CN8: 87042139, 87042199, 87043139, 87043199) - reported by reporter
2)	EUROSTAT - Comext (intraEU) for used motor vehicles for the transport of goods <=5t (CN8: 87042139, 87042199, 87043139, 87043199) - reported by partner (mirror value)
3)	German KBA - Re-registration data outside Germany / German Export
4)	Expert data from survey on European 2nd hand car market, conducted by Öko-Institut, TML, COWI (2010)
5)	ACEA - New Registrations <= 3,5t (http://www.acea.be/index.php/news/news_detail/new_vehicle_registrations_by_country/); MT and CY: Energy and Transport in figures 2010 (Pocketbook) for LCV * 0,85
6)	EUROSTAT - Comext (extraEU) for used motor vehicles <= 5t for the transport of goods (CN8: 87042139, 87042199, 87043139, 87043199) - reported by reporter

Attention: coverage of LCV for ACEA-NewReg <=3,5t, for Eurostat/Comext <= 5t

a)	Downloads from SDA-CIA
b)	German KBA (estimated as 5% of M1+N1; percentage taken from extra-EU-import as reported by Comext)
c)	Danish Customs SKAT (estimated as 5% of M1+N1; percentage taken from extra-EU-import as reported by Comext)
d)	Estonian Motor Vehicle Registration Centre ARK (value for 2009)
e)	approximate value from data given by national experts (Irish EPA, Revenue Commissioner-Vehicle Registration Branch ,SIMI)
f)	Italian Ministry of Transport / Italian Customs
g)	Dutch RDW
h)	Polish Ministry of Interior
i)	Swedish Transport Agency (values for 2009)
j)	Slovak Ministry of Interior

Estimated relevance of export for N1 for the year 2008

= reported by reporter
= reported by exporting partner

0.15 Threshold 1
0.30 Threshold 2
0.60 Threshold 3

source	ESTAT: Intra EU-27 Export		Polish Import			German Import			Other sources	Estimated minimum intra EU-27 Export	Change compared to export reported by reporter	Extra EU-27 export	ACEA New Registrations	Export / NewReg	Export (incl. EU Extra) / NewReg
	Reported by reporter	Reported by importing partner	Polish Import	ESTAT: Reported by polish statistics	ESTAT: Reported by exporting partners	Re-registration (KBA), share N1	ESTAT: Reported by German statistics	ESTAT: Reported by exporting partners							
1)	2)	7)	1)	2)	3)	1)	2)	5)	8b)	6)					
AT	2 561	2 738	3 094	521	583	688	752	917		5 247	2.0	1 415	32 763	16%	20%
BE	3 656	42 721	7 398	1 112	512	815	136	489		49 686	13.6	31 811	67 546	74%	121%
BG	7	29	2	0	0	7	4	6		34	4.8	62	11 478	0%	1%
CY	0	3	8	0	0		0	0		11	n.a.	25	4 444	0%	1%
CZ	126	86	121	49	18	83	14	16	a)	296	2.4	2 979	20 269	1%	16%
DE	11 938	184 224	42 793	8 466	4 720		0	0	b)	165 522	18.3	31 530	223 525	98%	112%
DK	5 002	5 039	4 766	1 478	1 243	216	103	500	c)	15 501	3.1	1 576	33 602	46%	51%
EE	291	75	7	15	68	7	0	16		291	1.0	204	2 976	10%	17%
ES	1 909	3 612	1 388	166	99	2 520	389	746	d)	18 125	9.5	1 106	165 872	11%	12%
FI	156	107	8	0	0	4	8	8		160	1.0	282	16 395	1%	3%
FR	10 459	12 569	16 389	5 773	3 285	1 580	1 381	1 937		23 384	2.2	4 701	458 937	5%	6%
GR	37	62	8	0	0	10	9	7		71	1.9	45	22 205	0%	1%
HU	86	159	125	12	10	21	2	7		291	3.4	743	21 559	1%	5%
IE	2	129	106	2	0	4	0	0		237	118.5	38	28 163	1%	1%
IT	4 608	119 723	4 600	596	372	1 741	603	933	e)	7 301	124 865	3 382	223 885	56%	57%
LT	163	44	37	9	49	16	1	5		163	1.0	10 171	3 000	5%	344%
LU	522	226	389	26	19	406	22	158		1 140	2.2	0	4 028	28%	28%
LV	22	160	11	0	0	22	4	2		189	8.6	93	2 041	9%	14%
MT	0	0	0	0	0	0	0	0		0	n.a.	1	666	0%	0%
NL	3 769	70 632	10 981	2 556	1 219	406	827	781	f)	70 000	78 636	23 580	84 654	93%	121%
PL	75	106	0	0	0	82	38	29	g)	764	10.2	6 103	55 896	1%	12%
PT	8	75	76	0	0	58	10	0		199	24.8	2 598	55 398	0%	5%
RO	41	37	5	11	2	10	9	4		50	1.2	36	36 414	0%	0%
SE	109	440	725	44	13	55	52	50	h)	6 094	55.9	333	39 269	16%	16%
SI	13	41	17	0	0	0	0	2		58	4.5	9 607	7 282	1%	133%
SK	4	52	47	11	1	9	1	0		96	24.0	26	26 900	0%	0%
UK	3 175	2 049	3 213	115	161	156	33	86		6 297	2.0	4 830	287 158	2%	4%

1)	EUROSTAT - Comext (intraEU) for used motor vehicles <= 5t for the transport of goods (CN8: 87042139, 87042199, 87043139, 87043199) - reported by reporter
2)	EUROSTAT - Comext (intraEU) for used motor vehicles for the transport of goods <=5t (CN8: 87042139, 87042199, 87043139, 87043199) - reported by partner (mirror value)
7)	Polish Ministry of Interior and Administration, Import data
3)	German KBA - Re-registration data within Germany / German Import
5)	Expert data from survey on European 2nd hand car market, conducted by Öko-Institut, TML, COWI (2010)
6)	ACEA - New Registrations (http://www.acea.be/index.php/news/news_detail/new_vehicle_registrations_by_country/); MT and CY: Energy and Transport in figures 2010 (Pocketbook) for LCV * 0,85
8b)	EUROSTAT - Comext (extraEU) for used motor vehicles <= 5t for the transport of goods (CN8: 87042139, 87042199, 87043139, 87043199) - reported by reporter

Attention: coverage of LCV for ACEA-NewReg <=3,5t, for Eurostat/Comext <= 5t

a)	Downloads from SDA-CIA, value (1089) not applicable as it is the total export but less than the extra EU export
b)	German KBA (estimated as 11% of M1+N1; percentage taken from extra-EU-import as reported by Comext)
c)	Danish Customs SKAT (estimated as 30% of M1+N1; percentage taken from extra-EU-import as reported by Comext)
d)	Spanish DGT
e)	Italian Ministry of Transport / Italian Customs
f)	Dutch RDW
g)	Polish Ministry of Interior
h)	Swedish Transport Agency (values for 2009)