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Depreciation of means of transport for Polish national accounts

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General information about the projects

- Trucks over 3.5 tons of gross vehicle combination weight (GVW) are surveyed in Poland, as in all EU countries, in order to determine the freight volume and transport work in a random sample. The sampling frame consists of vehicles included in administrative registers. In Poland, such a register is the Central Register of Vehicles and Drivers for the Ministry of the Interior and Administration.
- ESA2010 AND BPM6 IMPLEMENTATION, QUALITY IMPROVEMENT, AND EXECUTION OF THE GNI CONTROL CYCLE
- Transport by light utility vehicles

- Informations about vehicles – National Vehicle Database (before removing inactive vehicles)

- Informations about vehicle owner – National Vehicle Database, Statistical Unit Database (based on company number), RFTS questionnaire, webscraping

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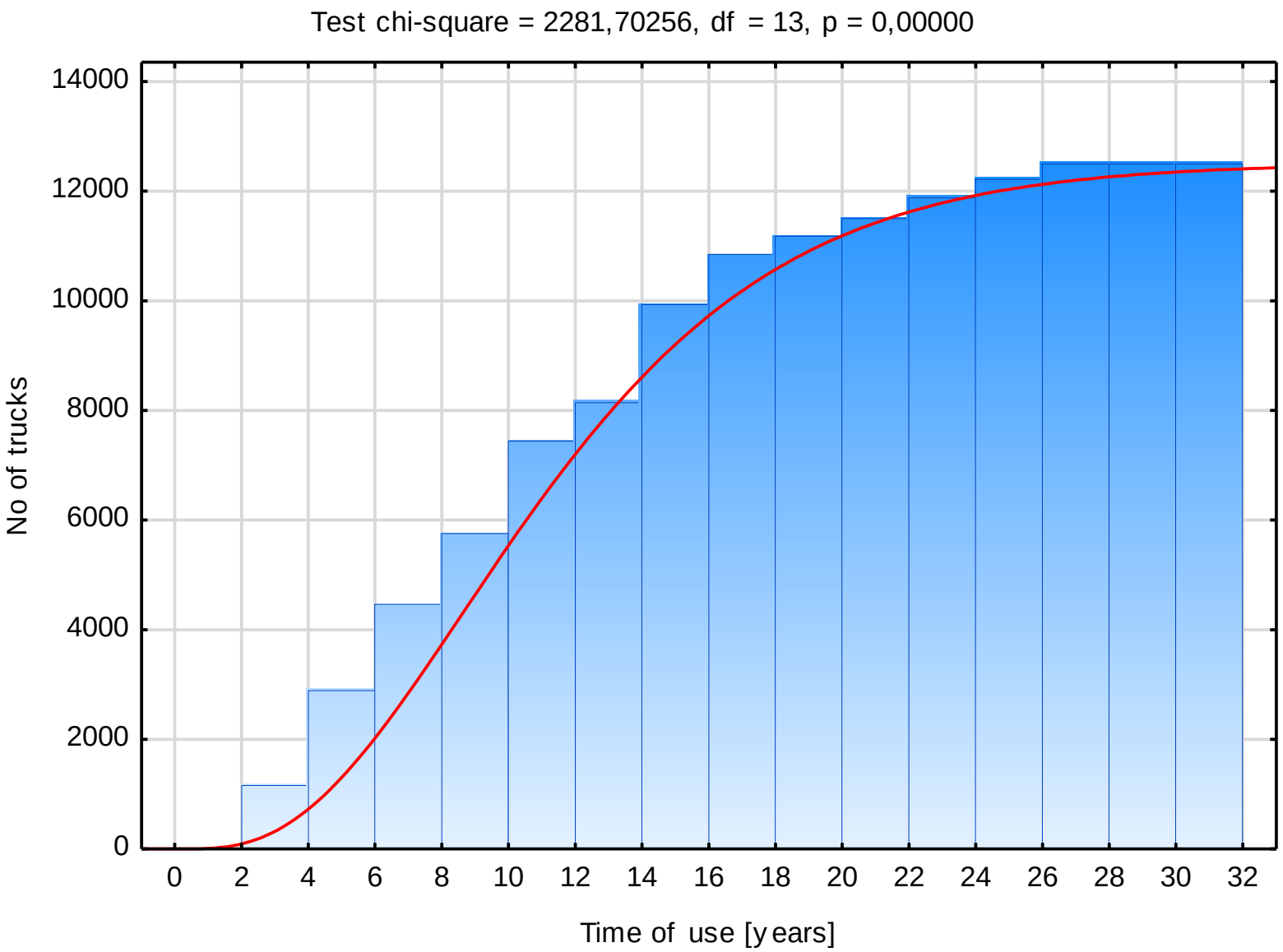
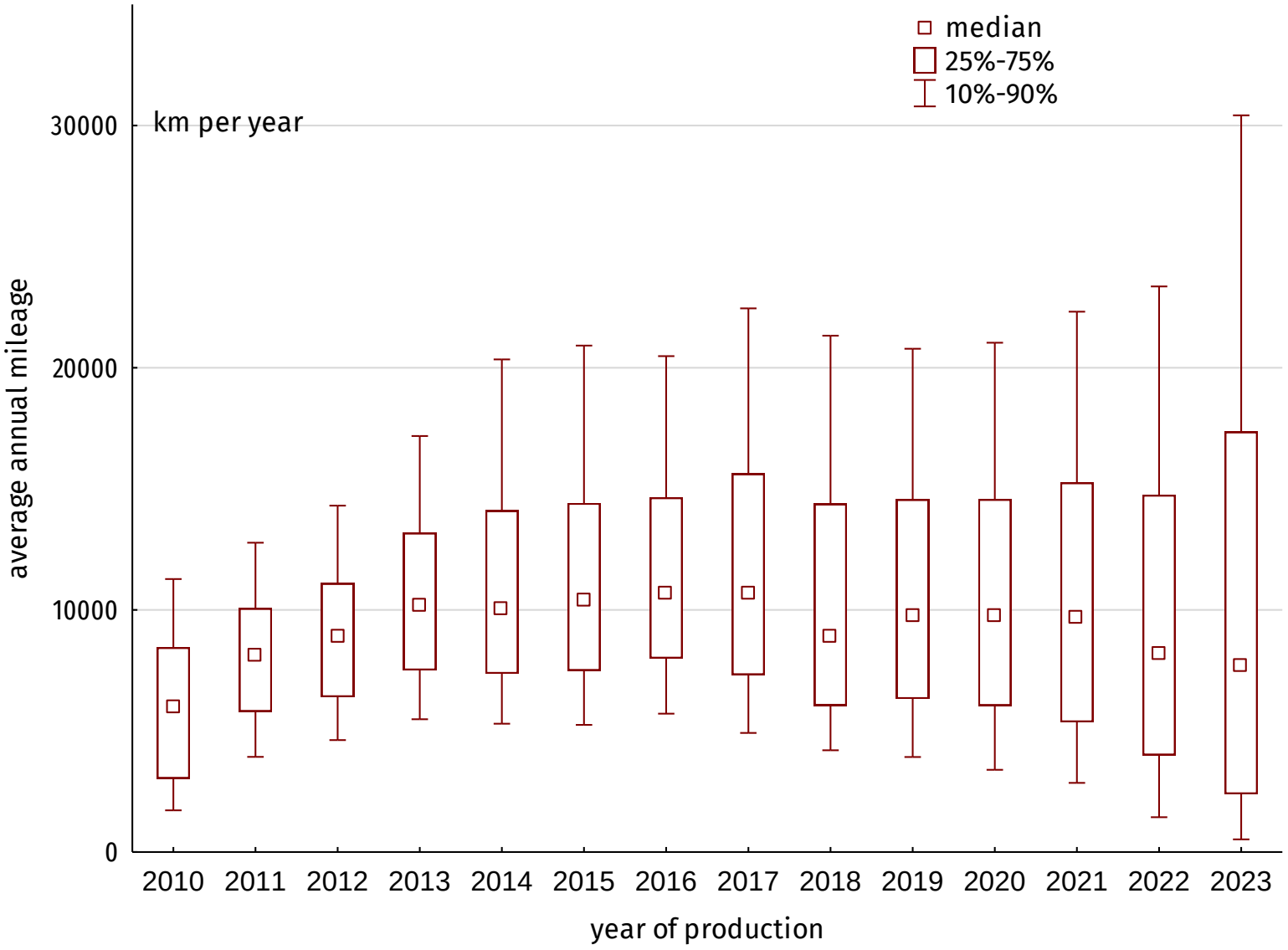
Fitting of the distribution

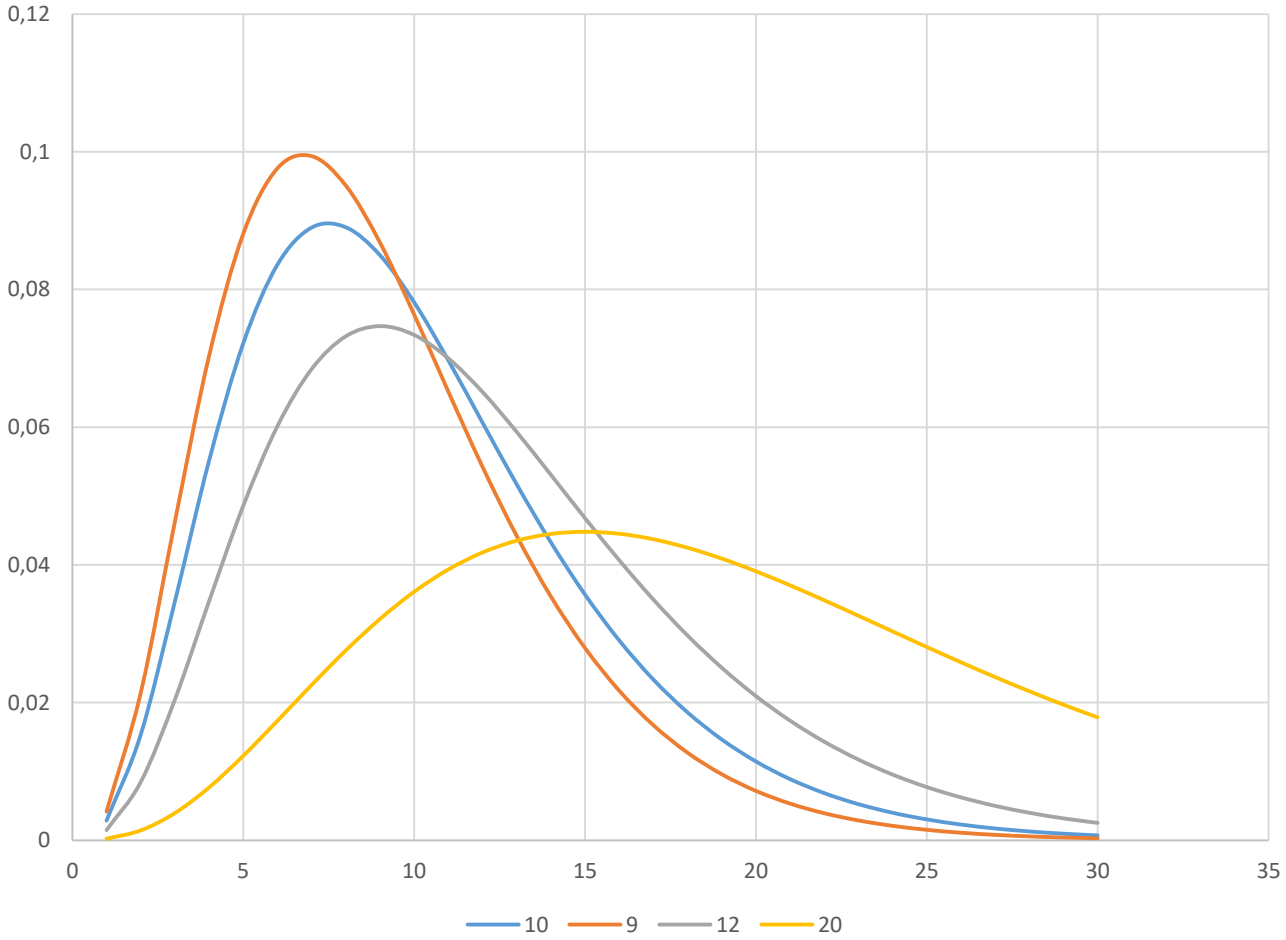
- Hypotheses were tested for fit with normal, uniform, exponential, gamma, log-normal and χ^2 probability density function
- the gamma distribution was chosen, also indicated in descriptions of other countries' methodologies
- $f(x|\alpha,\lambda) = \frac{\lambda(\lambda x)^{\alpha-1}}{\Gamma(\alpha)} e^{-\lambda x}$
- practices of the German statistical institute described in the Measuring Capital OECD Manual


Test chi-square = 2281,70256, df = 13, p = 0,00000
No of trucks
14000
12000
10000
8000
6000
4000
2000
0
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
Time of use [years]


median
25%-75%
10%-90%
km per year
30000
20000
10000
0
average annual mileage
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
year of production

$$f_{\bar{n}}(n) = \frac{4^4}{3!} \cdot \frac{n^3}{(\bar{n})^4} \cdot e^{-4 \cdot \frac{n}{\bar{n}}}$$

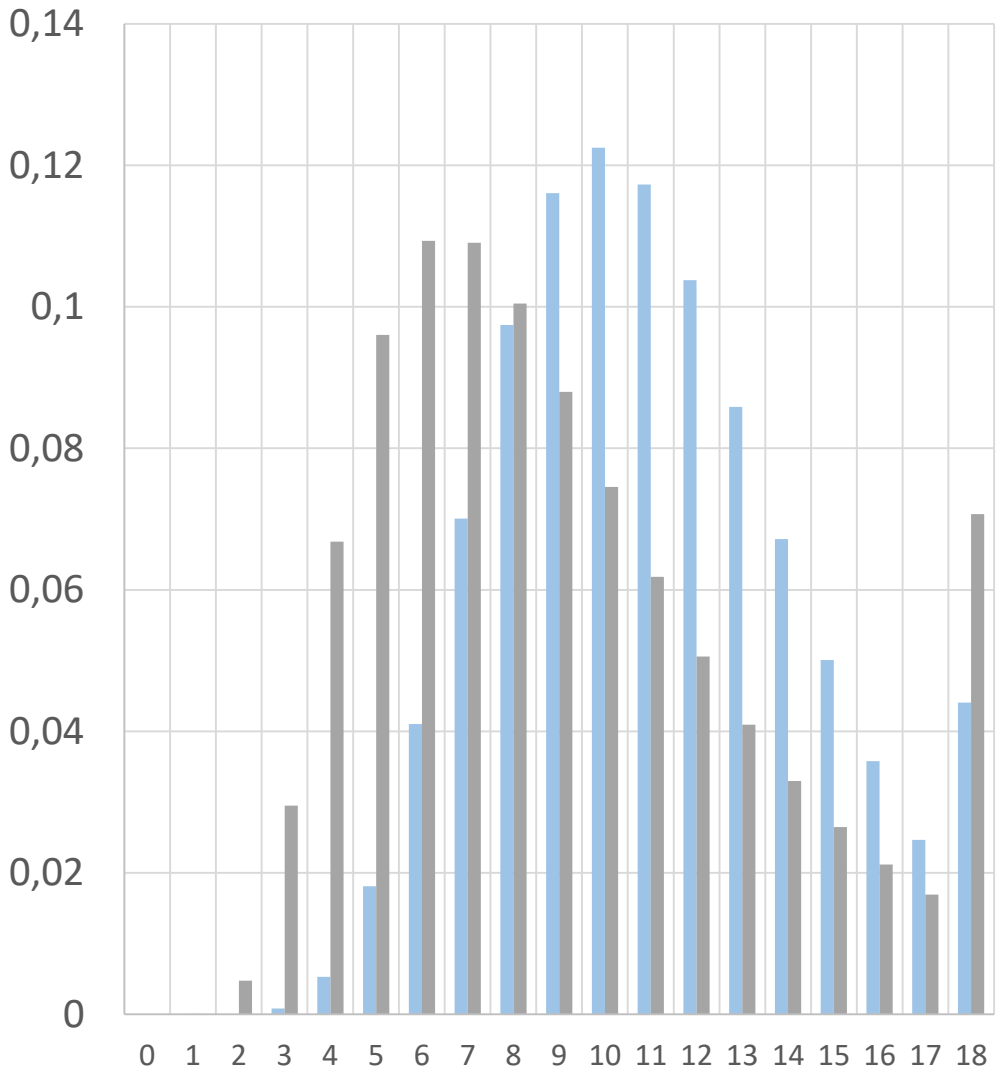
mortality function for assets with an average service life of 9..20



The retirements *R* of the reporting year *t* :

$$R_t = \sum_{i<t} I_i \cdot f_{\bar{n}}(t-i),$$

where I_i shows additions for year *i.*



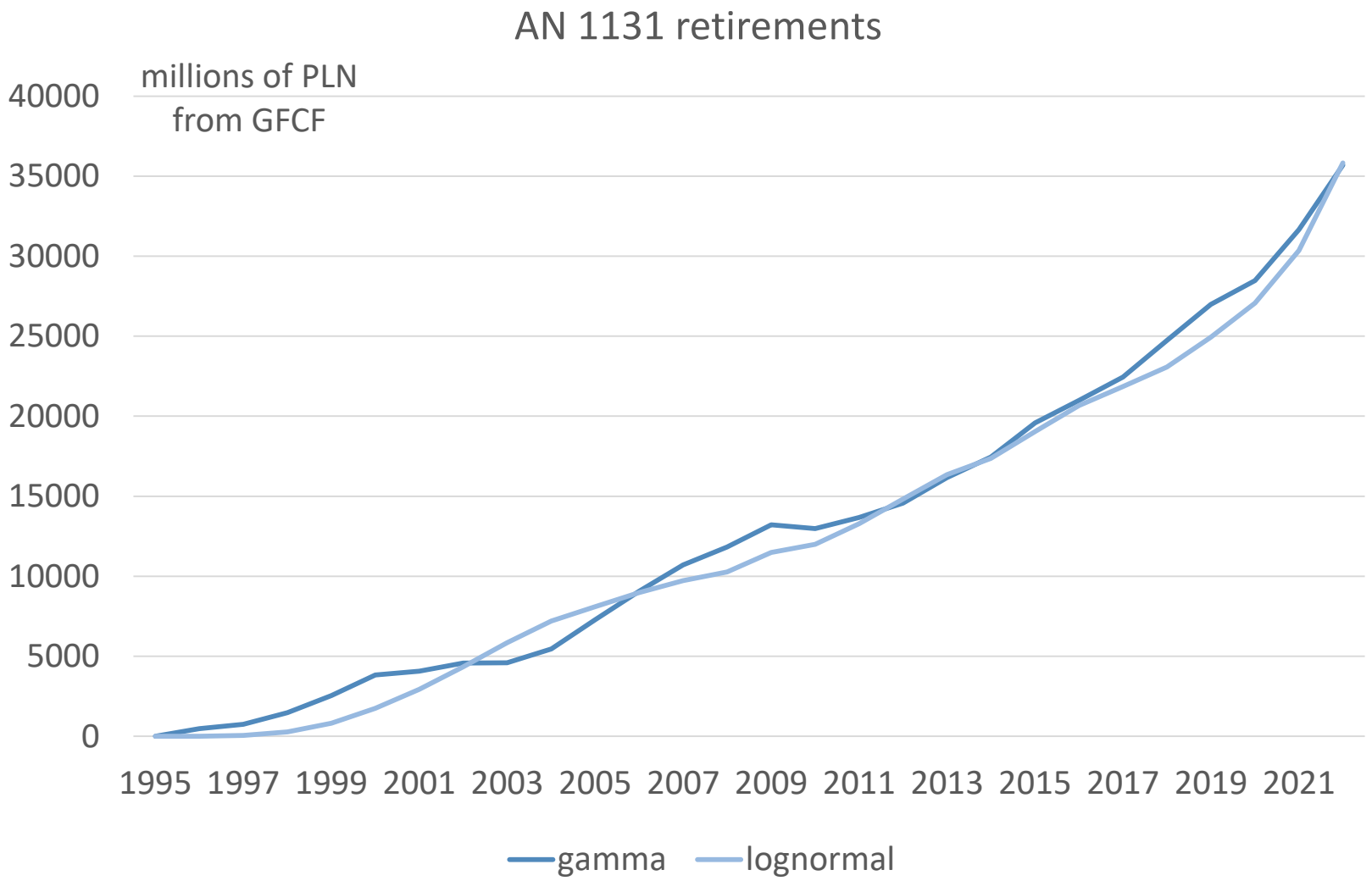
$$f(x|\alpha,\lambda) = \frac{\lambda(\lambda x)^{\alpha-1}}{\Gamma(\alpha)} e^{-\lambda x}$$

$$f(t|\mu,\sigma) = \frac{1}{\sqrt{2\pi}\sigma} \cdot e^{-\frac{(lnt-\mu)^2}{2\sigma^2}} \cdot \frac{1}{t}$$

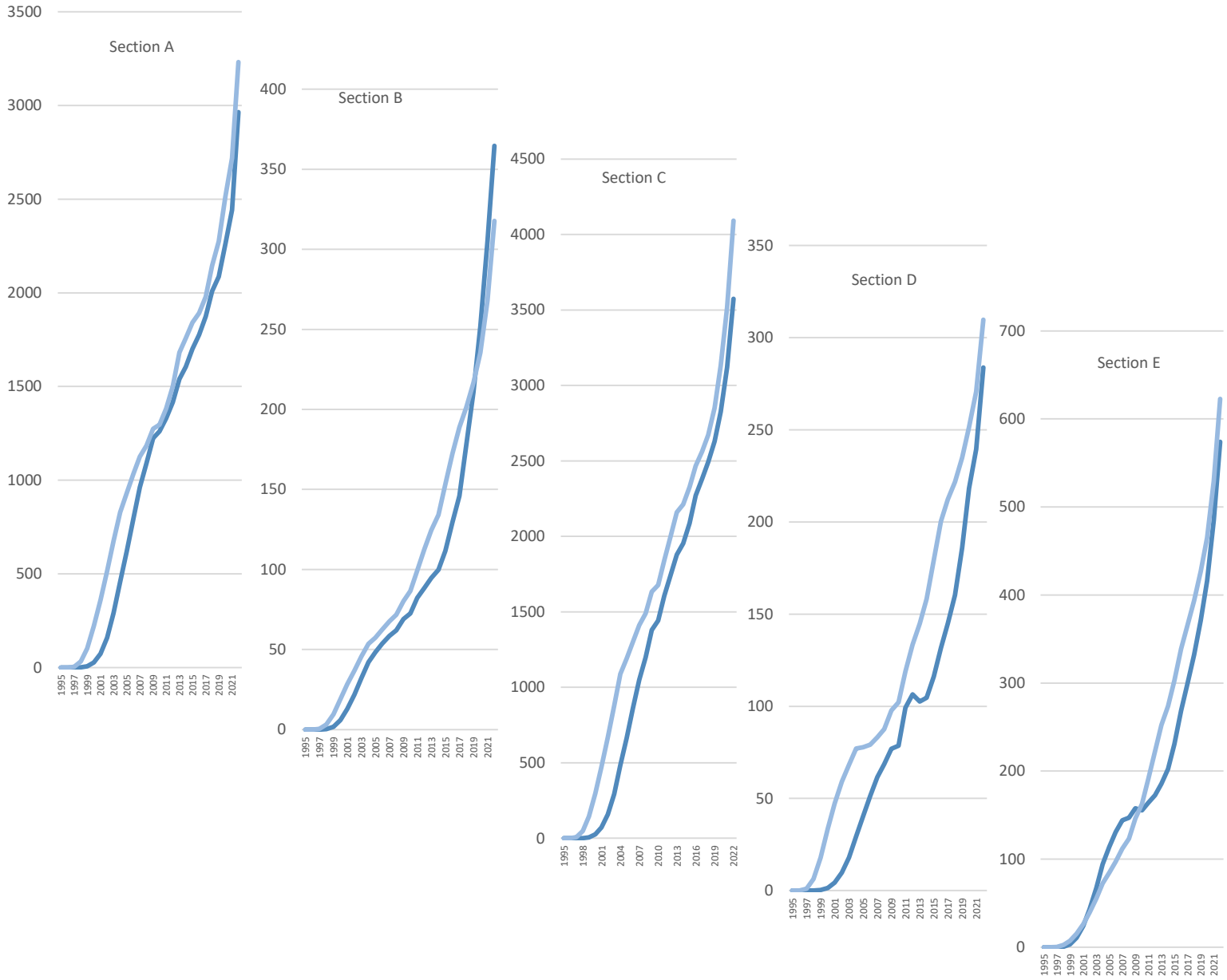
The calculation of the value of transport equipment AN 1131 for retirement

time series was prepared from 1995 giving a picture of the cohorts that were being reduced at their own respective rates. In accordance with the recommendations,
it was assumed that upon reaching age $2\bar{t}$, the fixed asset was being retired completely. The matrix below captures the pattern over time for each cohort (generation of fixed assets). In the full matrices, the last year of estimation was 2022, for the age of assets greater than $2\bar{t}$ the last 2022 –(1995+$2\bar{t}$) retirement rates are 0.

initial year of use	assets age cohort	investment outlays	IO_{1995}	IO_{1996}	IO_{1997}	…	$IO_{1995+\bar{t}}$	…	$IO_{1995+2\bar{t}}$
		gross fixed capital formation	$GFCF_{1995}$	$GFCF_{1996}$	$GFCF_{1997}$	…	$GFCF_{1995+\bar{t}}$	…	$GFCF_{1995+2\bar{t}}$
		time	1995	1996	1997	…	1995+$\bar{t}$	…	1995+$2\bar{t}$
1995+$2\bar{t}$	$2\bar{t}$								0
…	…								…
1995+$\bar{t}$	$\bar{t}$						0		$F(\bar{t}) - F(\bar{t} - 1)$
…	…						…		…
1997	2				0	…	$F(\bar{t} - 2) - F(\bar{t} - 3)$	…	$F(2\bar{t} - 3) - F(2\bar{t} - 2)$
1996	1			0	$F(1) - F(0)$	…	$F(\bar{t} - 1) - F(\bar{t} - 2)$	…	$F(2\bar{t} - 2) - F(2\bar{t} - 1)$
1995	0		0	$F(1) - F(0)$	$F(2) - F(1)$	…	$F(\bar{t}) - F(\bar{t} - 1)$	…	$1 - F(2\bar{t} - 1)$
usage year			1995	1996	1997	…	1995+$\bar{t}$	…	1995+$2\bar{t}$
retirements			↓ for cohort 0	↓ sum for cohorts 0..1	↓ sum for cohorts 0..2	…	↓ sum for cohorts 0..$\bar{t}$	…	↓ sum for cohorts 0..$2\bar{t}$

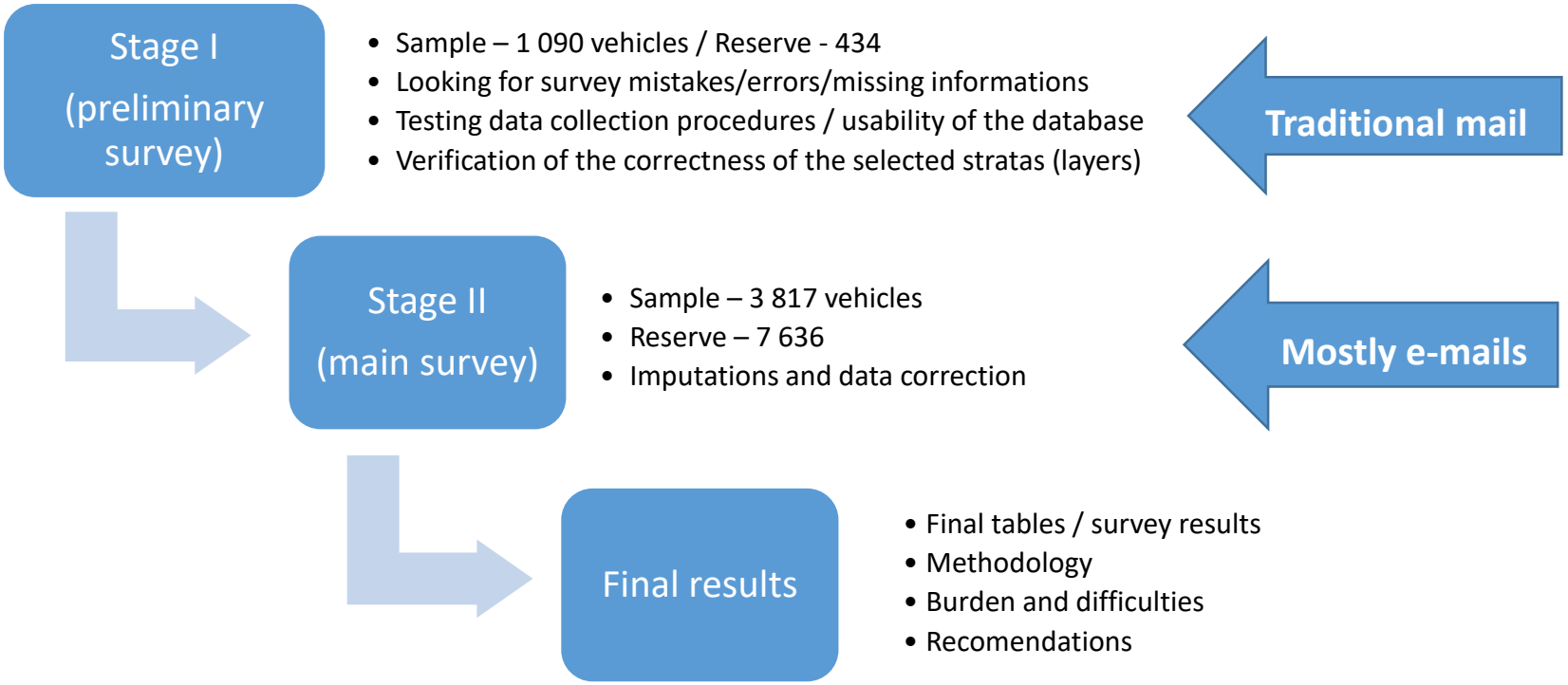


Source: calculations for GFCF estimates of national accounts



Source: calculations for GFCF estimates of national accounts

Survey organisation



Stage I – preliminary survey

- Total number of vehicles – 399 927 (raw data from National Vehicle Register - only at the disposal of business entities)

- Population – 367 448 (after elimination of records – doubling, with missing data, with unrealistic data, etc.)

- Sample – 1 090 / Reserve 434 vehicles (some vehicles were owned by the same company)

The survey covered vehicle up to 25 years old inclusive, with maximum permissible laden weight up to 3.5 tonnes, by load capacity from 400 kg to 1 599 kg. Type of fuel – mostly diesel (almost 90%).

Stage I – preliminary survey

The vehicles were selected from the following sections:

- G – Wholesale and retail trade,
- K – Financial and insurance activities (vehicle leasing companies),
- C – Manufacturing,
- F – Construction,
- N – Administrative and support service activities,
- H – Transportation and storage,
- Other sections.

Correspondence to the units (form with a cover letter) was sent to the users of the selected vehicles in printed form via **traditional mail**. The form included the survey period, the submission deadline, the place of submission, and the contact details of a person responsible for that enterprise.

Stage I – problems occured

- Contact with units – difficult and time consuming
- Traditional mail – time consuming, cost ineffective, delays in delivery
- K section (leasing) – time consuming, hard to get information about the user
- Survey instructions – not detailed enough

Pros
and advantages

- Survey clarity corrections
- Making more detailed examples
- Moving K section to others
- Changing traditional mail into e-mails

Stage II – main survey

The vehicles were selected from the following sections:

- G – Wholesale and retail trade,
- ~~K – Financial and insurance activities (vehicle leasing companies),~~
- C – Manufacturing,
- F – Construction,
- N – Administrative and support service activities,
- H – Transportation and storage,
- Other sections (section K moved in here).

Survey in PDF format (with an introducing message) was sent to the users of the selected vehicles based on **e-mails**. The form included the survey period, the submission deadline, the place of submission, and the contact details of a person responsible for that enterprise.

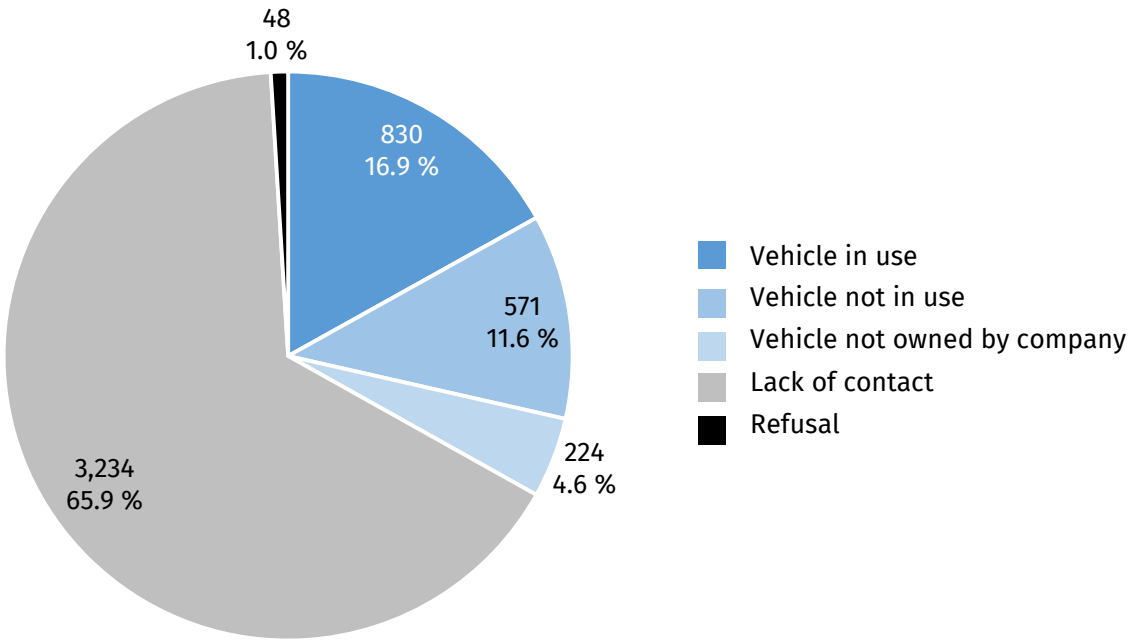
Burden and difficulties of the project

Employees burden:

- Difficulty in contacting the units,
- Company refusals,
- Problems with obtaining a complete survey,
- Burden due to the need to register paper or scanned questionnaires in a dedicated system,
- Sending and receiving questionnaires,
- Resolving technical and substantive issues reported by the units participating in the survey.

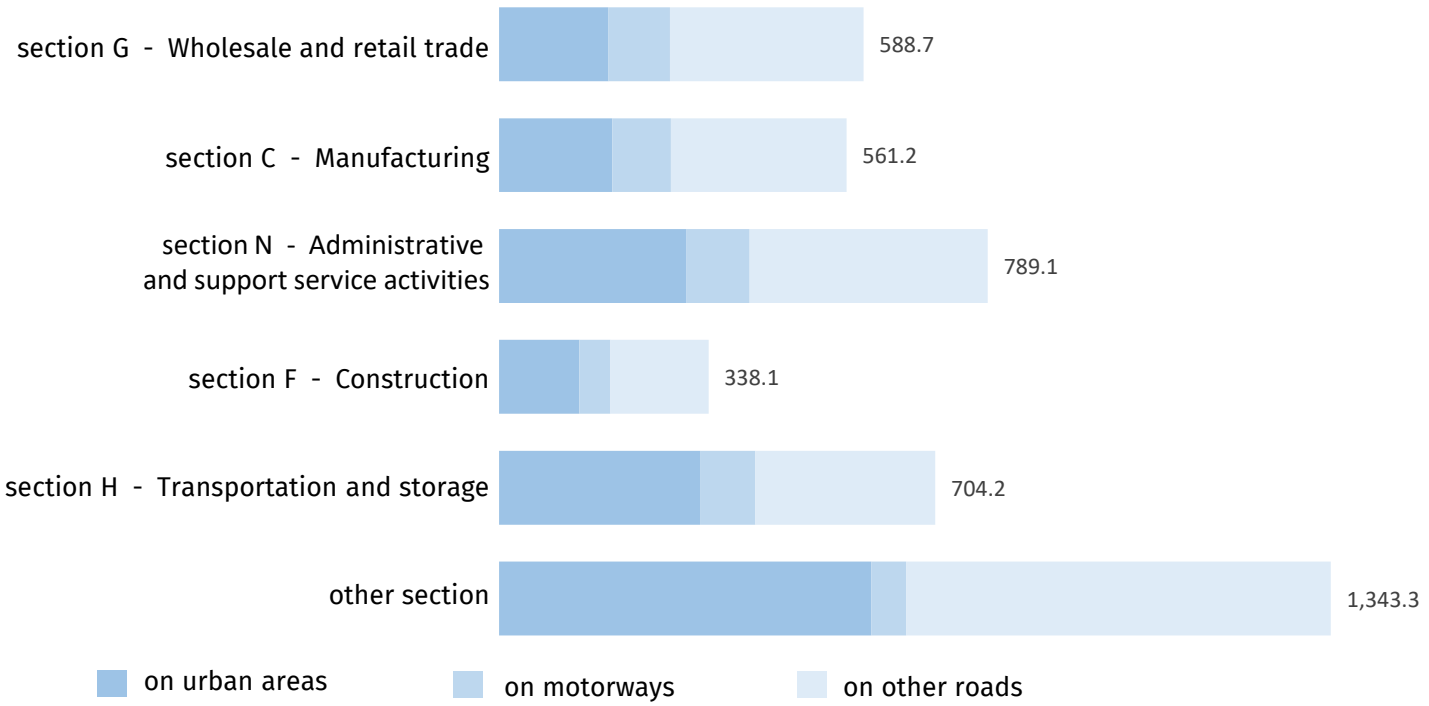
Survey completeness and results

Completeness of the survey, despite its non-mandatory nature amounted to **32.3% (positive + negative responses)**, with **16.9% of positive questionnaires**.



Survey completeness and results

Mileage in million kilometers of LUVs by NACE sections:



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Thank You