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Exploring the European Road Freight Transport Survey: Potentials, Challenges, and Limitations

Marcel Porschen[a]*,Marcus Klatte[a], Tobias Kuhnimhof[a]

Chair and Institute of Urban and Transport Planning, RWTH Aachen University, Aachen, Germany, 52074

Abstract

This paper examines the European Road Freight Transport Survey, a comprehensive European microdata set compiled under Regulation (EU) No. 70/2012, to assess its potential, challenges, and limitations. These include both the limitations of the data collected and methodological inaccuracies in the surveys in different countries. The article describes the structure of the data set, which consists of three interlinked data sets: vehicle, journey and goods records. The aim is to explore methodological inconsistencies and data limitations, offering recommendations for enhancing the dataset's reliability and usability. The analysis shows significant impact of different exclusion criteria such as the weight or age of vehicles. One effect is that the majority of routes that are recorded in one country are not recorded at all in other countries. Limiting to the most restrictive limit would have little impact on the overall data and would filter out less than 5% of the observations Another important result concerns the age structure of vehicles. In some countries, such as Italy and France, there are strict age limits for the vehicles surveyed, which has an impact on the representativeness of the data. The article concludes with recommendations for harmonizing the methodology or providing a harmonized data set and raising awareness of the limitations of this data in official disseminations.

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Keywords: Road Freight Transport; Freight survey; Microdata; Heavy-duty Vehicle; European Union

1. Introduction

In the European Union, 77% of the inland freight transport (tonne-kilometers (tkm)) is accounted for by road freight transport. The remaining 23% are divided into 17% by rail transport and 6% by waterway transport (Eurostat, 2024a). The high proportion of road freight transport underscores its significance in and for Europe. Consequently, an

* Corresponding author. Tel.: +49 2418023632.
E-mail address: Porschen@isb.rwth-aachen.de

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understanding of road freight transport is of significant importance in the formulation of policy recommendations and guidelines, such as the development of charging infrastructure for heavy-duty vehicles.

In many cases freight surveys are commodity and establishment based. The US Commodity Flow Survey (CFS) is a shipper-based survey of approximately 100,000 establishments from different economic sectors. While on aggregated level similar analysis can be made such as type of commodities shipped, their origin and destination, their value and weight, and mode of transport, data on the individual journey and vehicle is not available in such surveys. The CFS is basis for the Freight Analysis Framework (Hu et al., 2022). Since 2020 the Federal Highway Administration provides annual truck OD data. Trips are estimated using truck GPS data and validated using other data sources. The dataset includes movement by freight trucks and light-duty transportation trucks used for intercity and local deliveries. The OD tables are aggregated based on 583 zones (U.S. Department of Transportation, Federal Highway Administration, 2022). Due to the data collection method no information on the transported goods is available within this dataset.

The European micro-dataset "European Road Freight Transport Survey" is based on vehicles whose journeys, including the goods transported, were recorded. The annual data collection is mandatory for the European Member States and is based on Regulation (EU) No.70/2012 on statistical returns in respect of the carriage of goods by road, which was amended by Council Regulation (EU) No.517/213. The regulation states that “Each Member State shall compile statistics for the Union on the carriage of goods by road by means of goods road transport vehicles which are registered in that Member State, and on the journeys made by such vehicles.”

It is stated that this regulation shall not apply: Malta is excluded as long as the number of licensed goods road vehicles for international transport does not exceed 400 vehicles. Vehicles whose weight or dimensions exceed the usual limits in the Member States concerned. Agricultural, military and government vehicles are excluded, except those of public undertakings such as railroad companies. Member States may exclude vehicles with a loading capacity (LC) of less than 3.5 tons or a maximum permissible laden weight (MPLW) of less than 6 tons.

The following terms have been defined to ensure the uniformity of the data collected and this paper will use these terms accordingly: **Load capacity (LC):** maximum weight of goods declared permissible by the authority of the country of registration of the vehicle (Eurostat). **Maximum permissible laden weight (MPLW):** is the total weight of the vehicle and of the load declared permissible by the competent authority of the country of registration of the vehicle (Eurostat, n.d.c). **Lorry:** a rigid road vehicle designed exclusively or primarily to carry goods” (Regulation (EU) No.70/2012) **Road tractor:** a road transport vehicle designed exclusively or primarily to haul other road vehicles which are not power-driven (mainly semi-trailers)” (Regulation (EU) No.70/2012)

The data for road freight compiled in the European dataset is obtained by compiling random sample surveys using questionnaires. The actual implementation and final design are the responsibility of the national authorities. In the past questionnaires were mostly sent in paper form to companies whose vehicles were selected for the sample. Recently, several reporting countries have started to use electronic questionnaires. The microdata refers to vehicles, their journeys and the goods transported (Eurostat, n.d.b).

In addition to the European dataset, compiled by Eurostat, secondary use of the primary data collection is carried out by national authorities (Kraftfahrt-Bundesamt, 2024b). These authorities receive the so-called D-Tables from Eurostat and use them to evaluate the data set with regard to European freight traffic on their territory. Separate quality and methodology reports are available, e.g., on how to estimate the domestic transport performance (Karner et al., 2014). The quality report of the German authority points out some gaps, such as the fact that empty journeys are not recorded for Italian vehicles. It also points out differences to another potential data source, namely the toll statistics (Kraftfahrt-Bundesamt, 2024a). In the context of national datasets, Courtonne et al. (2018) examined uncertainties in the domestic statistics of France and compared them with those of Sweden and Germany. McKinnon and Leonardi (2009) and McKinnon (2012) looked upon the data collection of road freight data under the older Regulation established in 1998. One of the main takeaways was that, although the standardization of data collection in the EU is to be welcomed, there are still major differences between the countries. It was also expected that further harmonization would only progress slowly and that reduced efforts in the area of freight transport surveys might happen.

Eurostat provides a variety of descriptive analyses based on the European dataset (Eurostat, 2024b). This paper therefore looks at what additional information can be obtained through an independent analysis of the microdata set and whether the existing dissemination addresses the existing shortcomings of the dataset. It aims to explore the

potentials, challenges and limitations associated with working with this dataset. Two types of limitations are considered. Firstly, those based on the data collected that are part of the dataset or where information is not available for analysis. Second, limitations based on the way in which the dataset is generated. These include, in particular, inaccuracies resulting from the individual surveys carried out in each country. The aim is to formulate recommendations for the use of the dataset and to present possible analysis options.

The introduction is followed by a section describing the structure of the data set. This includes the number of observations and a basic description of variables. The third section deals with the possibilities of data analysis and deals in particular with the spatial and temporal resolution. Subsequently, the different data collection methods are outlined. The focus here is on the differences in the vehicles considered in terms of weight and age and the resulting effects on the data set.

2. Dataset Structure

The data, accessible for the years 2011 to 2023, comprises three linked datasets containing anonymized individual records related to the vehicle (A1), the journey (A2), and the goods (A3). Data collection is either mandatory or voluntary, depending on the variable. In total the three datasets consist of 29 unique variables, including three identifier variables. The linkage of datasets is possible through those identifier variables. Data of the previous year is published in November of the following year. Information on the dataset structure and the released variables can be found in the user manual (Eurostat, n.d.a)

The data of the vehicle dataset is either extracted from the vehicle registers or collected from the owners of the vehicle. Data on journeys and goods are questionnaire based, either filled in by the driver or extracted from the database of the company (Eurostat, n.d.b).

The 2022 dataset comprises approximately 381,000 vehicle records, 4,320,000 journey records, and 2,995,000 goods records, resulting in a ratio of 11 journey records to 1 vehicle record. The majority of recorded journeys are domestic, with 94% of journeys starting and ending within the same country. This leaves 6% or 206,842 journey records to be international (defined as origin and destination in different countries). The number of goods records is lower than the journey records due to the inclusion of unladen journeys in the journey dataset, which account for approximately 38% of all journeys. Upon subtraction of the aforementioned journeys, a ratio of 1.1 goods records per laden journey record is obtained. The proportion of journey records linked with more than one good is 2.4% (Eurostat, 2023a).

2.1. Journey records per country

The variable ‘Countries’ is not directly available, but can be derived as a result of NUTS classification systematic. NUTS stands for Nomenclature of territorial units for statistics. The territory of the European Union is divided into territorial units on three hierarchical levels. The highest level is NUTS1, which is subdivided into NUTS2 regions and those are further divided into NUTS3 regions. The shape of NUTS2 regions can be seen in Figure 1 (European Commission, 2024). In this data set the start and end of individual journeys or freight transport are aggregated on NUTS2 level. However, not all journeys can be clearly assigned, as three or fewer freight data records in a cell or ending in a NUTS 2 region are each coded with SUPP. However, this only affects 0.1% of the journey data records. Likewise, about 0.1% of the data records can be assigned to a start country but no specific NUTS 2 region.

Taking into account the statistical grossing up factor in the data set, the shares shift significantly in some cases. The grossing-up factor always refers to vehicles; there are no additional grossing-up/weighting factors for journeys or individual goods. It is noticeable here that Poland, for example, has a high “grossed up” share of 10.92%, while the share of journey records sampled is only 3.7%. There are also particularly large differences in Luxembourg (91%), Hungary (58%) and Austria (40%). In these countries, the sample size is particularly high compared to the total population (vehicles). An above-average number of vehicles were also surveyed in Germany at 32.8% of the total vehicle fleet. However, only the journeys of half a week are surveyed, which means that the time-based sampling rate of 0.96% is considerably lower than in the countries that survey one of the 52 weeks of the year (1.92%). The journey

records that start in a country do not necessarily always involve journeys made by vehicles registered in that country. It can also be vehicles from other countries that start journeys in that country (Table 1).

Table 1: Number of unweighted journey records per country- Share of unweighted journey records and statistically weighted share. Based on (Eurostat, 2023a).

Start country	Journey records	Share	Grossed up share	Start country	Journey records	Share	Grossed up share	Start country	Journey records	Share	Grossed up share
DE	1,168,129	27.0%	24.89%	PT	79,083	1.8%	1.05%	BG	44,520	1.0%	1.0%
NL	398,062	9.2%	5.56%	RO	75,831	1.8%	1.09%	NO	43,282	1.0%	1.6%
FR	385,872	8.9%	10.25%	SK	73,989	1.7%	2.25%	LV	39,813	0.9%	0.5%
ES	367,385	8.5%	12.25%	SE	73,257	1.7%	2.62%	SI	37,948	0.9%	0.7%
AT	345,582	8.0%	3.19%	BE	72,139	1.7%	1.64%	CY	25,367	0.6%	0.3%
HU	218,763	5.1%	1.51%	IE	81,060	1.9%	1.43%	LT	24,622	0.6%	0.3%
PL	159,283	3.7%	10.92%	PT	79,083	1.8%	1.05%	FI	14,033	0.3%	1.3%
IT	143,854	3.3%	4.30%	EL	65,642	1.5%	2.4%	EE	13,282	0.3%	0.2%
CZ	104,046	2.4%	3.76%	DK	64,922	1.5%	0.9%	UK	4,664	0.1%	0.1%
CH	85,650	2.0%	3.02%	HR	52,351	1.2%	0.7%	Other	2,152	0.0%	0.0%
IE	81,060	1.9%	1.43%	LU	51,610	1.2%	0.2%	NA	4,664	0.1%	0.1%

2.2. Spatial and temporal resolution

Eurostat offers data tables containing information on the locations of loading and unloading. (Eurostat, 2023d). However, these data set lacks the link between the places of loading and unloading. The micro-data set at hand includes, the corresponding place of loading and unloading for each journey or individual goods operation, thus enabling the examination of origin-destination matrices. Figure 1 presents a visualization of the relevance of different regions for transport operations originating from a specific region. In terms of transport performance, it can be observed that in addition to the regions situated in the vicinity of the region of loading, journeys to more distant destinations also exhibit a high number of annual tkm. If this figure were based on the number of journeys, the regions in the immediate vicinity would dominate even more, especially the home region, which is also the top region in terms of transport performance. Another potential use could be to analyze differences in the distribution of journey lengths in different NUTS2 zones or between good types (NST 2007 classification). Information on the exact route taken is limited to the first two and last three countries crossed in transit.

Due to the hierarchical structure of NUTS, it is possible to aggregate the data to NUTS 0 (Country) and NUTS1 (e.g., Federal States in Germany) in order to possibly draw further conclusions. A limitation arises due to the fact that spatial information has been recoded from the more granular NUTS3 to NUTS2 level. This often leads to the aggregation of multiple economic centers into one larger region, especially in polycentric areas of Europe. Consequently, a significant number of journeys are classified as intraregional. In such instances, the traveled distance can be employed to ascertain whether the journey was conducted in the vicinity of a single city or if it is more probable to be an inter-city transport operation.

One major limitation is that the dataset does not allow for a detailed temporal analysis of individual journeys. The only temporal variables available are the year and quarter, making it impossible to analyze journey start and end times or the journey duration. It is also not possible to aggregate journeys on a weekly or monthly basis, although at least a quarterly breakdown is possible in relation to the annual trend. On the other hand, the consistency of the methodology allows for a longitudinal analysis of most countries from 2011 to 2023, so that economic and special effects (Ukraine war/Covid-19 pandemic) can be examined. One problem in regards to the time series arises due to the fact that it is stated in the reference metadata that time series are not in line with the real development. This is a result of improvements undertaken by reporting countries to reduce the problem of underreporting. Underreporting has always

been a known problem with this survey. Although the companies operating the vehicles are obliged to participate, they can reduce their workload by not reporting journeys (Eurostat, n.d.b).

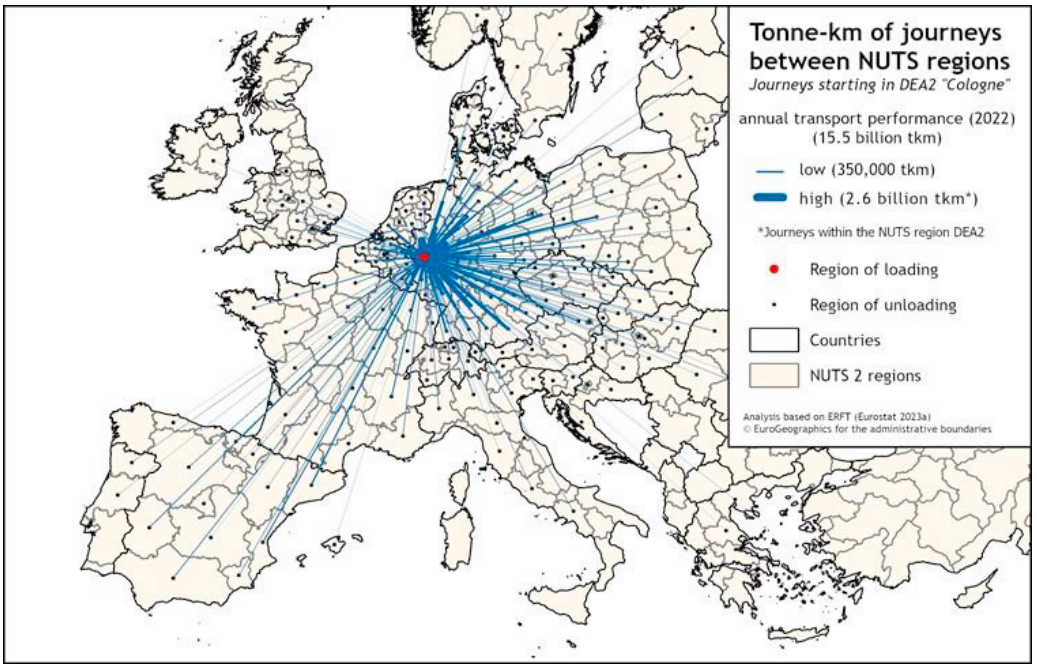


Figure 1: Illustration of aggregated and grossed up journeys between places of loading and places of unloading using the example of the NUTS region DEA2. Based on Eurostat, 2023a.

3. Survey methodologies and its implication on the results

Information on the survey methodologies can be found in different places. The document 1) Road freight transport methodology (European Commission, 2025) consists of legally-binding and voluntary recommendations for the sample surveys, variables and dissemination and also rules for transmission to Eurostat. Information on the implementation in the surveying countries can be found in 2) Methodologies used in road freight transport surveys in Member States, EFTA and 3 Candidate countries (Eurostat, 2025, 2023b). This document largely overlaps with 3) Reference metadata (Eurostat, n.d.b), which is available on the Eurostat website. However, additional information can be found in the metadata, such as where to find more country specific information. Dedicated methodology or quality reports are often not available, e.g., in the Spain section it is stated: “In addition to these metadata pages and the Eurostat reports, there aren't additional national quality reports.“ (Eurostat, n.d.b). In other cases, there is just a link to the responsible authority and no link to a document. In cases where national methodological reports are available, these often go only slightly beyond the reports published by Eurostat or deal primarily with the national secondary use of the data set (Kraftfahrt-Bundesamt, 2024a).

3.1. Data collection on national level

Data collection is conducted at the national level by national organizations, with only the variables to be collected being predefined (Eurostat, 2023c). The micro-dataset consists of data collected from 31 countries, reported quarterly to Eurostat. These include 26 EU Member States (excluding Malta), two EFTA countries (Norway, Switzerland), the United Kingdom, North Macedonia and Montenegro. Each reporting country considers the vehicles registered in their respective country. In the anonymized micro dataset, the registration country is omitted, rendering it impossible to differentiate between journeys of domestic and foreign vehicles. Consequently, the data quality for journeys in a

specific country additionally depends on the survey methods, sampling, and weighting of other countries, whose vehicles perform journeys abroad. The dataset also includes additional countries such as Ukraine, Turkiye as origins or destinations of journeys by vehicles registered in the reporting countries (Eurostat, 2023a).

The evaluation and interpretation of data present challenges when considering the differences in survey methodology across national contexts. Variations exist, for example, in the data collection, the stratification of the sample (Table 2) and the vehicles excluded from the survey. Countries, for instance, define different requirements for maximum allowable age and (minimum) weight of vehicles for data collection (Table 3 and 4).

Table 2 shows some examples of differences in national approaches. While all countries use a vehicle register as a sampling base, some countries also use other data sources, such as tax information. In some countries (e.g., Poland), a vehicle register was set up specifically for this survey. With regard to the time unit, most countries agree that the journeys made by a vehicle within a week should be surveyed. The only exceptions to this are Germany and Finland.

There are significant differences in the stratification of the sample, both in terms of the characteristics and the number of strata. While the sample in Poland has 192 strata, Luxembourg does not use stratification at all, and the German sample has 72 strata. In addition to the typical types of strata, such as the type and weight of the vehicle and the region of registration, there are a number of other possibilities, some of which are only used in one country. Other stratification criteria include fleet size, permits to do international transport, transport dangerous goods and vehicle milage. Greece has the most specific stratum, as there is a stratum designed to prevent too many vehicles from one specific large company with a large vehicle fleet from being included in the sample.

Even within typical strata, there are significant differences in the class boundaries chosen. For example, the spatial strata in Austria only refer to Austria excluding Vienna and Vienna itself, while in Spain they refer to the Canary Islands and the rest of Spain, and in other countries they refer to NUTS 1 regions.

Table 2: Overview of survey design element in the reporting countries (Eurostat 2023b).

country	sampling base		time unit:	stratification						
	vehicle register	other sources	one week	geo-graphical	vehicle Type	vehicle Age	vehicle weight/ LC	type of transport	company sector	Other
Austria	X	X	X	X	X		X	X		
Belgium	X		X				X	X		
Bulgaria	X		X	X			X			
Croatia	X		X	X						X
Cyprus	X		X				X	X		
Czechia	X		X	X			X			
Denmark	X	X	X		X		X			X
Estonia	X		X		X		X		X	
Finland	X	X			X		X	X		X
France	X		X		X	X	X		X	
Germany	X			X	X		X		X	
Greece	X		X	X	X			X		X
Hungary	X		X	X	X		X			
Ireland	X		X			X	X			X
Italy	X	X	X	X			X	X		
Latvia	X	X	X			X	X			X
Liechtenstein	X	X	X		X					
Lithuania	X	X	X		X		X		X	X
Luxembourg	X		X	-	-	-	-	-	-	-
Montenegro	X		X		X		X			X
Netherlands	X	X	X		X	X	X	X	X	
North Macedonia	X		X		X		X			X
Norway	X		X	?	?	?	?	?	?	?
Poland	X		X	X	X	X	X			
Portugal	X		X	X	X		X	X		
Romania	X		X	X			X	X		
Slovakia	X	X	X		X		X			X
Slovenia	X		X		X		X			X
Spain	X		X	X	(X)		X	X		

Sweden	X		X		X		X		X			
Switzerland	X		X			X		X			X	
UK	X	X	X	X	X		X					X

The statistical weighting is done in the surveys of the individual countries. Due to different sample drawing/stratification and time units the weighting formula varies from country to country. Information on the weighting can be found in the summary document (Eurostat, 2025, 2023b) and the national reference metadata prepared by the responsible countries and compiled by Eurostat (Eurostat, n.d.b).

Differences in the data weighting approach have an impact on the vehicle data set (A1). Individual data records (within a quarter) may not be actual individual vehicles. For example, in Germany, the weighting is done on a monthly basis. This means that if a vehicle is recorded in two different months, this will result in two individual vehicle records with different grossing up factors. (Eurostat, 2023c). The upcoming sections focus on the different exclusion criteria and concepts for weight and age.

3.2. Weight limitations

Multiple EU-Countries excluded vehicles with less than 3.5t LC or below 6.0t MLPW as stated in the regulation. However, in this case there are also countries that deviate from this limitation. Overall, there are 10 different minimum weight limitations and one country without a minimum limit. Table 3 shows the different weight criteria. The criteria can be differentiated into LC and MPLW- based. In addition, there is a unladen weight limitation in Ireland. The LC-limits range from 1t in Belgium to 3.5t in multiple countries such as Germany. The MPLW-limits range from 3.5t to 6.0t. But there are also some subtle differences. For example, in France, vehicles below 3.5t MPLW are excluded, while in Finland it is vehicles of 3.5t and below. The most restrictive minimal limitation can be found in Greece and Spain where both Vehicles below a MPLW and LC threshold are excluded.

Table 3: Vehicles excluded by weight below a specific threshold. Based on Eurostat, 2023c.

Minimum weight exclusion	Country
No limitation	Slovakia
< 1 t LC	Belgium
< 2 t LC	Czechia, Slovenia, Austria
< 3 t LC	Cyprus
< 3.5 t LC	Germany, Estonia, Croatia, Italy, Latvia, Luxembourg, Hungary, Portugal, Romania, Sweden, Norway
< 2 t unladed weight	Ireland
< 3.5 t MPLW	France, United Kingdom, North Macedonia, Montenegro
<= 3.5 t MPLW	Finland, Netherlands, Portugal, Switzerland
<= 3.5 t MPLW & < 1.5t LC	Poland
< 6 t MPLW	Bulgaria, Denmark, Lithuania
< 6 t MPLW& < 3.5t LC	Greece, Spain

One option would be to apply the most restrictive restriction to the entire data set. Figure 2 shows the cumulative share of journeys by weight. Based on the total data set, it can be seen that only a small proportion of journeys are made by vehicles with a maximum permissible laden weight of less than 6.0t. However, for individual countries this could have serious consequences. Due to the low weight, the transport performance is influenced to a much lesser extent than the journey number. For journeys starting in Slovakia, 47.9% of laden journeys and 2.62% of transport performance (tkm) are accounted for by vehicles below this limit. This figure also shows typical vehicle sizes, such as 40.0t. While the distribution in Germany is more in line with the average, there is a significant deviation in Italy. Here, there are significantly fewer journeys made by larger vehicles. Maximum weight limitations are way less common and are only explicitly stated in two countries- France and Norway. Norway excludes vehicles of 35t or more

MPLW, France differentiates between lorry and road tractors. Lorries with more than 32.5t LC and tractors of mor than 44.5t LC are not covered.

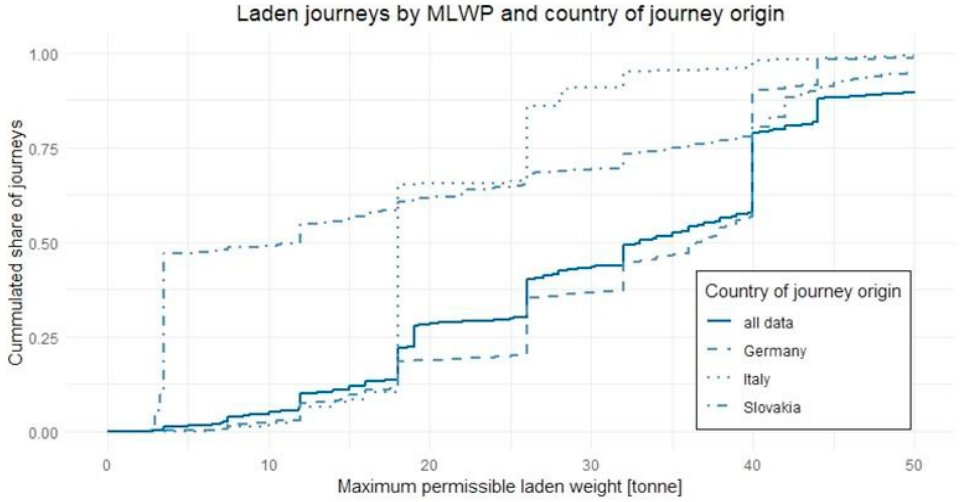


Figure 2: Cumulative share of Laden journeys by MLWP. Based on Eurostat 2023a.

3.3. Age limitations

In 13 countries there is a limitation to the maximum vehicle age. Older vehicles are excluded of the survey. Once again, there are various different limits in place. Of the countries applying an age limit, the highest is for vehicles older than 30 years (Germany, Austria, Sweden and North Macedonia). Most common is the exclusion of vehicles older than 25 years (Estonia, Latvia, Lithuania, Netherlands, Poland, Romania, Montenegro). In 4 countries the limit is at 30 years of age. France and especially Italy apply a stricter age limitation. France limits vehicle age to less than 15 years and Italy to less than 11 years. This raises the question of whether a relevant number of journeys or tkm is not taken into account. The number of vehicles excluded by this criterion depends on the age limitation and the composition of the vehicle fleet in the given country.

In Germany the limit is 30 years, resulting in 2% of lorries being excluded (Kraftfahrt-Bundesamt, 2022). This seems to be justifiable as the share of tkm resulting of older vehicles journeys is quite small. Vehicles older than 15 years (and not older than 30 years) cause just 0.5% of the overall tkm of journeys originating in Germany. For Poland, the Netherlands or Estonia the limit is 25 years and vehicles older than 15 and not exceeding the limitation account for 10%, 5% and below 1% of the total tkm.

Table 4: Share of different age groups of road tractors in 2022 (in relation to tractors up to 20 years). Based on Eurostat, 2023b.

	<2 years	2 to 5 years	5 to 10 years	10 to 20 years	>20 years
Germany	37% (37%)	35% (36%)	20% (21%)	6% (7%)	1%
France	21% (22%)	34% (35%)	30% (31%)	12% (12%)	2%
Italy*	(14%)	(26%)	(17%)	(43%)	No data
Spain	12% (15%)	17% (20%)	28% (33%)	28% (33%)	14%
Poland	13% (15%)	16% (18%)	25% (29%)	32% (37%)	15%

* The total number of road tractors only includes vehicles of up to 20 years. Percentages do not add up to 100% due to rounding.

Based on the data provided by Eurostat we are able to compare the age of road tractors between different countries. Just looking at the five most populous EU-Member (Table 4) we are able to identify large differences in age structure of registered road tractors. In Germany more than three quarters are younger than 5 years. In France it is still more

than half of the registered road tractors. On the other end there is just a small share of 1 and 2% of road tractors older than 20 years in those two countries. In contrast 14 and 15% of road tractors in Poland and Spain are falling into that category. Unfortunately, we do not have information on the Italian road trucks older than 20 years. Therefore, we look at vehicles not older than 20 years and derive new shares. For Germany and France this has a minimal effect as most vehicles are younger anyway. In Italy 43% of vehicles not older than 20 years are between 10 to 20 years old. Compared to Poland with 37% and Spain with 33%. We assume that there is a substantial share of road tractors older than 20 years in Italy as well. The ACEA report on vehicles in use in Europe indicates an average age for medium and heavy commercial vehicles of 19 years for Italy. German vehicles are 9.7, French 9.2, Spanish 14.3 and Polish 13.1 years on average (European Automobile Manufacturers Association, 2023).

The relevance for transport performance cannot be derived 1:1 from the vehicle age distribution. Older vehicles may be used less frequently or tend to cover shorter distances. For this reason, the share of journeys and transport performance of vehicles over 11 years old was compared in the five countries under consideration (Table 5). For journeys within Germany, such vehicles make 7.73% of journeys and cover 1.99% of tkm. In France, the figures are somewhat lower despite the proportion of older vehicles, but this can be explained by the 15-year age limit. In Poland, older vehicles account for the largest share: They carry out 52.82% of journeys and cover a significant 35.21% of tkm. For journeys that start and end in the respective country, a proportion of foreign vehicles is used that cannot be directly quantified on the basis of the available data set. As a result, 3.15% of journeys from Italy to other countries and 2.9% of tkm are made by vehicles over 11 years old. Overall, it can be said that due to the age structure of Italian vehicles, shares similar to those in Spain and Poland are more likely to be expected than those of Germany. This would mean a significantly higher journey and transport performance of Italian vehicles than is captured in this data set.

Table 5: Share of journeys and tkm performed by vehicles older than 11 years. Based on Eurostat, 2023a

	Journeys starting in …				Journeys ending in …				Journeys within …	
	total		international		total		international		national	
	journeys	tkm	journeys	tkm	journeys	tkm	journeys	tkm	journeys	tkm
Germany	7.56%	2.19%	3.54%	2.67%	7.55%	2.11%	3.57%	2.43%	7.73%	1.99%
France	6.05%	1.86%	3.81%	2.03%	6.07%	2.10%	4.49%	2.74%	6.16%	1.79%
Italy	2.50%	0.92%	3.15%	2.90%	0.93%	1.10%	3.57%	3.50%	0.00%	0.00%
Spain	42.62%	11.36%	8.65%	3.45%	42.62%	11.87%	8.81%	3.51%	43.31%	14.69%
Poland	51.09%	24.40%	10.12%	5.94%	51.11%	24.90%	9.38%	5.21%	52.82%	35.21%

*National journey defined as: Origin and Destination of a journey within the same country
**International journey: Origin and Destination of a journey in different countries

Country-specific characteristics and restrictions are partly summarized in the Eurostat document (Eurostat, 2023c). However, in the case of Italy and Ireland, for example, no reference is made to the age structure of the vehicles or a possibly incorrect transmission. There are also no recommendations on how to deal with these restrictions. Concerning is, that results based on this data is published without sufficient notes, regarding its limitation. Under the “Statistics Explained”- section of the Eurostat-website we can find an article on the “Road freight transport by vehicle characteristics”. In this article is written that: “At the other end of the scale, a major part of the vehicle-kilometers was performed by vehicles of 10 years and over, in Ireland (100.0%), Greece (79.6%) and Cyprus (50.0%).” (Eurostat, 2024b). Also, a diagram shows the share of vehicle-kilometers by age and country- indicating that the share of vehicles 15 years and over is 0% in Italy. It is not mentioned that this value is a result of the fact that vehicles over 11 years of age are not surveyed in the Italian survey. (Eurostat, 2024b)

4. Conclusion and Recommendations

This study has explored the European Road Freight Transport Survey, highlighting its potentials, challenges, and limitations. The dataset, structured in vehicle, journey, and goods records, provides valuable insights into freight transport operations across Europe. However, several inconsistencies and methodological limitations must be

addressed to enhance its usability for both researchers and policymakers. Fundamental limitations and the difficulty of harmonizing different national methodologies that have already been identified by McKinnon (2010) therefore continue to exist.

Significant disparities in data collection methodologies across countries impact the comparability and reliability of the dataset. Differences in survey techniques and vehicle age restrictions introduce biases that may distort cross-country analyses. With the current data set, for example, it cannot be guaranteed that the transport performance of individual countries will be determined correctly. Furthermore, there are uncertainties regarding the weight class distributions between the countries, as these are based on different survey methods and restrictions.

Due to the large number of institutions involved and the established procedures, it is difficult to imagine a harmonization of the methodology, but it should at least be striven for if possible. To improve the dataset's reliability, greater harmonization of methodologies across countries is recommended. This could include standardizing vehicle weight thresholds, ensuring consistency in survey techniques, and providing clear documentation on data limitations. This will make data users and the public more aware of the restrictions and limitations. Furthermore, individual countries should be excluded from the official data presentation, even if this only applies to some of the selected variables. Enhancing public awareness of these limitations will ensure more accurate interpretations of the data, thereby supporting evidence-based policy decisions. A more detailed resolution of the spatial data and distribution of freight traffic could support infrastructure planning, especially with regard to charging networks for electric freight vehicles. For this it would be necessary to add additional temporal variables to the datasets.

Ultimately, while the European Road Freight Transport Survey can serve as an important tool for analyzing road freight transport trends, the microdata only provides for a few additional analysis options. Therefore, adding additional variables and continued improvements to transparency are necessary to maximize its potential and ensure it remains a reliable resource for researchers and policymakers.

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