This article mainly analyses the relative importance of the different inland transport modes (road, rail, inland waterways) in the European Union (EU). It explains the principles of the modal split and the adjustments applied to road freight data in order to compare the share of each of the three modes in the transport performance on each country’s territory. In addition, this article presents the results on modal split at EU level for five transport modes (including maritime and air transport) and explains the calculation principle for air and maritime transport performance.

Figure 1: Freight transport in the EU-28 (%): modal split of inland transport modes (% of total tonne-kilometres)
Source: Eurostat, (rail_go_typeall) (rail) (iww_go_atygo)(inland waterways) (road_go_ta_tott) (national road transport) (road_go_ca_c) (cabotage road transport) and Eurostat computations (international road transport)

Figure 2: Modal Split of inland freight transport, 2014 (% of total tonne-kilometres)
Source: Eurostat, (rail_go_typeall) (rail) (iww_go_atygo)(inland waterways) (road_go_ta_tott) (national road transport) (road_go_ca_c) (cabotage road transport) and Eurostat computations (international road transport), see also country codes
Table 1: Modal Split of inland freight transport (% of total tonne-kilometres)
*Source:* Eurostat, (rail_go_typeall) (rail) (iww_go_atygo) (inland waterways) (road_go_ta_tott) (national road transport) (road_go_ca_c) (cabotage road transport) and Eurostat computations (international road transport)

Table 2: Transport performance of inland modes (million tkm, adjusted for territoriality)
*Source:* Eurostat, (rail_go_typeall) (rail) (iww_go_atygo) (inland waterways) (road_go_ta_tott) (national road transport) (road_go_ca_c) (cabotage road transport) and Eurostat computations (international road transport)

Table 2 (continued): Transport performance of inland modes (million tkm, adjusted for territoriality)
*Source:* Eurostat, (rail_go_typeall) (rail) (iww_go_atygo) (inland waterways) (road_go_ta_tott) (national road transport) (road_go_ca_c) (cabotage road transport) and Eurostat computations
Table 3: International road transport performance in the EU and EFTA countries, by territory on which the transport was performed, 2014 (*)
Source: Eurostat computations

Table 4: International road freight transport: main foreign hauliers driving on national territory, 2014 (*)
Source: Eurostat computations

Figure 3: Freight transport in the EU-28 (‘): modal split based on five transport modes (% of total tonne-kilometres)
Source: Eurostat, (rail_go_typeall) (rail) (iww_go_atygo)(inland waterways) (road_go_ta_tott) (national road transport) (road_go_ca_c) (cabotage road transport) and Eurostat computations (international road transport, air and maritime transport)

Table 5: Freight transport performance in the EU-28 (*) (million tkm, adjusted for territoriality)
Source: Eurostat, (rail_go_typeall) (rail) (iww_go_atygo)(inland waterways) (road_go_ta_tott) (national road transport) (road_go_ca_c) (cabotage road transport) and Eurostat computations (international road transport, air and maritime transport)
Main statistical findings

Modal split in the EU and the countries

Modal split of inland freight transport in 2009-2014: road transport continues to carry around 75% of freight in the EU

Road transport continues having the largest share of EU freight transport performance among the three inland transport modes. In 2014, road transport accounted for 74.9% of the total inland freight transport (based on tonne-kilometres performed). Since 2009, the share of rail has increased and from 2011 onwards stabilised at around 18.5%. In 2014, rail transport stood for 18.4%, slightly under the shares it had in 2011 and 2012. The share of inland waterways for EU freight transport fluctuates between 6% and 7%, reaching a share of 6.7% of the total inland transport performance in 2014. At country level, there was a noticeable shift in the modal shares from 2009 to 2014 in Estonia and, to a lesser degree, also in Romania and Slovenia.

Figure 1 shows that freight transport by road continued to dominate at EU-28 level in 2014, accounting for close to three-quarters of the total inland tonne-kilometres performed. This share has remained almost unchanged since 2009. However, a slight decrease in the share of road is noted over the observed time-span. In 2014, road freight transport accounted for a share of 74.9%, a decrease of 2.2 percentage points (pp) compared to 2009. In 2014, the share of rail remained almost unchanged compared to the previous year (+0.2 pp). This continued the stabilisation at this level observed for rail transport since 2011, following the drop to 16.9% in 2009 and subsequent recovery. During the period observed, the share of inland waterways fluctuated between 6% and 7%. In 2014, it reached 6.7% of the total inland transport performance.

Noticeable changes in the modal split of Estonia, Romania, Slovenia, the Netherlands and Hungary in 2014 compared to 2009

Even though the modal split between the different modes of transport does not tend to change radically from year to year at EU level, changes are sometimes more noticeable at country level. As can be seen from Figure 2, the modal split at country level varies considerably and obviously depends on the availability of a given mode. Only 17 of the Member States have navigable inland waterways. In addition to not having navigable inland waterways, Cyprus and Malta do not have railways; thus, for these two Member States the share of road freight transport is 100%. The importance of rail transport in the Baltic States is quite evident (essentially linked to the transport of Russian energy products to the Baltic Ports). For several years, this share used to be in the range of 70%-80%. In 2013, the share of rail fell to below 70%, in both Estonia and Lithuania; in 2014, this negative trend continued undiminished in Estonia, with the share of rail falling by another 8.5 pp to 55.2% (see also Table 1). Inland waterways has a very important role in freight transport in the Netherlands. Despite a slight fall (-0.5 pp) from the year before, the share of inland waterways freight transport (46.6%) almost matched the share of road (47.6%). High traffic on the Danube also explains the comparatively high shares taken by inland waterways in Bulgaria and Romania (close to 30% in both countries).

Table 1 shows that between 2009 and 2014, the share of road in total inland transport performance dropped by 11.6 pp in Romania. There were substantial falls in the share of road also in Slovenia (-8.2 pp), Hungary and the Netherlands (both -6.7 pp) over this period. There were noticeable drops in the share of road also in Finland (-5.2 pp), Italy (-4.0 pp), Belgium (-3.9 pp) and Portugal (-3.3 pp). The falling share of road observed in Romania over this
period was offset by increases in the shares of both rail (+7.1 pp) and inland waters (+4.5 pp). In Hungary and Slovenia, the fall in the road share was primarily caused by an increase in rail transport of the same magnitude (Slovenia has no navigable inland waterways). In contrast, the fall in the road share for the Netherlands corresponded almost completely to the increase in inland waterways, while the share of rail remained more or less unchanged.

A special case is Estonia, where there has been a sharp fall (-31%) in rail transport performance from 2013 to 2014 (see also table 2), mainly caused by a fall of close to 50% in transport of petroleum products. As a consequence, the relative share of rail in total inland freight transport performance fell by 18.9 pp seen over the period 2009-2014; as Estonia has no navigable inland waterways, the fall in the share of rail was completely offset by a corresponding raise in the relative share of road. Other countries that recorded noticeable increases in the share of road in 2014 compared to 2009 were Luxembourg (+5.1 pp), Bulgaria (+4.4 pp) and Latvia (+4.1 pp).

When looking at the two most recent reference years, Estonia stands out with a steep increase in the share of road with 8.5 pp from 2013 to 2014. The reason for this increase is the sharp fall in rail transport mentioned above, which led to the share of rail falling by the same scale. Two other Member States recorded an increase of 3.3 pp in their road share: in Sweden, this increase corresponded to the decrease in rail (Sweden has no navigable inland waterways), while in Luxembourg the increase in the share of road was offset by a decrease in the shares of both inland waterways (-2.1 pp) and road (-1.2 pp). From 2013 to 2014, the share of road fell by between 1 and 1.5 pp in four Member States. These were Lithuania (-1.5 pp), Italy (-1.3 pp), Slovenia (-1.2 pp) and Bulgaria (-1.1 pp). As there is no (or only minor) inland waterways transport in Lithuania, Italy and Slovenia, the decrease in the share of road was directly reflected in a corresponding increase in the share of rail in these Member States. In Bulgaria, the decrease in the road share, together with a decrease in the share of inland waterways (-0.5 pp), was matched by an increase in the share of rail by 1.7 pp.

It should be kept in mind that the modal shares are calculated on the basis of the total transport performance as a denominator. This means that an increasing share of one mode does not necessarily express a higher transport performance registered for that mode. In certain cases, this can be a result of noticeable drops in other modes. The recent development in Estonia, where a sharp drop in rail transport directly reflected on a steep increase in the share of road transport in the country, is a case in point. This is the main reason why the tonne-kilometres data used for calculating the modal split are also presented in this article (Table 2).

### Inland freight transport performance - the need to adjust road transport

The modal split outlined in this publication is based on the total inland freight transport performance expressed in tonne-kilometres. Complying with the relevant EU legal acts, data on road and inland waterways transport are reported according to the ‘territoriality principle’ (transport on the national territory, regardless of the nationality of the haulier). However, road transport data is reported according to the nationality of the haulier (regardless of where the transport took place). Therefore, road transport has to be adjusted according to the ‘territoriality principle’. More information on how this is done is available in the “Data sources and availability” section below.

### Inland freight transport performance in the EU up by almost 4% since 2009

Table 2 shows the transport performance data used for the calculation of the modal split (modal shares are shown in Table 1). As mentioned above, the data referring to road transport have been adjusted to reflect on which country’s territory the transport took place, regardless of who performed this transport. When analysing the tonne-kilometres series used for the calculation of the modal split, an increase (3.8%) in the total freight transport performance in the EU was registered between 2009 and 2014. It should be noted that large decreases in rail transport performance were observed in many of the Members States in 2009, reflecting the worldwide financial and economic crisis.

The aggregated EU-28 transport performance figures show that in the total inland transport performance in the EU-28 had recovered somewhat by 2014 (2 236 billion tonne-kilometres) compared to the level in the middle of the crisis in 2009 (2 154 billion tonne-kilometres). However, the pre-crisis levels of 2008 (2 441 billion tonne-kilometres) had not yet been reached in 2014. Whereas in 2014, road transport performance in tonne-kilometres stood only 0.9% higher than in 2009, it had increased by 13.0% for rail transport and 15.6% for inland waterways over this period.

Looking at the most recent reference years at EU level, the freight transport performance of rail and road registered a growth of 1.1% and 0.4% respectively between 2013 and 2014, while that of inland waterways transport fell by 1.3%.

At national level, the largest decreases in total transport performance of inland modes between 2009 and 2014 were observed in Cyprus (-44.3%), Greece (-33.0%), Estonia (-26.5%) and Italy (-21.2%). As Cyprus has no railways or navigable inland waterways, the fall in transport performance was caused exclusively by the decrease of road transport. Greece experienced sharp fall in both road (-32.8%) and rail transport (-43.7%) over this period. As already mentioned, the fall in total transport performance in Estonia was mainly caused by a sharp decrease in rail transport of petroleum products. In Italy, the fall in total transport performance was due to a large drop in road...
transport (-24.6%); both rail and inland waterways transport increased over the period, by 12.8% and 18.5% respectively, but at much lower levels than road transport.

Looking specifically at road freight transport over the latest two reference years, tonne-kilometres dropped significantly in Cyprus (-14.9%), however at a much slower rate than the previous year (-29.8%). Also Italy and Bulgaria noted larger falls in road tonnes-kilometres from 2013 to 2014, by 6.2% and 5.6% respectively. After a fall of 10.1% from 2012 to 2013, the road transport performance in Luxembourg recovered strongly in 2014, with an increase of 18.6%. Road transport performance also experienced an upward trend in 2014 in Sweden (18.4%), Portugal (5.7%), Slovakia (5.6%), Ireland (5.2%) and the Czech Republic (4.5%).

Who drives where in international road freight transport?

Whereas both national and cabotage road freight transport are inherently territorial and need no adjustment, the ‘territorialisation’ of international road freight transport, done for the purpose of establishing the modal split between the different modes of transport, generates some interesting findings.

Table 3 shows the ranking of the countries according to the territories where international performance took place, i.e. where hauliers drove most (regardless of who was performing the transport) in 2014. Due to the size of the country and its location in the middle of Europe, but also due to its importance as a country with large manufacturing industries, German roads continue to come top in the European-wide international road freight transport: 28.4% of all tonne-kilometres performed in international road freight transport (corresponding to 151 billion tonne-kilometres) took place in Germany, increasing slightly from the year before. France followed next, although far behind, with a share of 18.9%. Poland and Spain had shares of between 8% and 7%, while Italy and Belgium had shares of between 6% and 5%.

Table 4 lists the five main countries of origin of foreign hauliers performing international transport in a given country in 2014. For instance, Belgium’s road network was most used for international transport by hauliers registered in the Netherlands, Poland, Germany, Luxembourg and France. Hauliers from these five countries, taken together, were responsible for 58.8% of the tonne-kilometres performed in international transport by foreign hauliers on Belgian territory.

A regional pattern can be detected when looking at the individual countries. Hauliers from the surrounding countries are often the most important foreign hauliers in a given country. Good examples of this are Austria and Finland. The only exception seems to be hauliers registered in Poland, which appear among the top foreign hauliers for every single Member State in 2014, and thus is one of the most active hauliers in international road transport in Europe. The share of Polish hauliers among the foreign hauliers is as high as 38.4% in Slovakia, 34.4% in Germany and 32.5% in Lithuania. Even in geographically distant countries, Polish hauliers remain active: for instance, 21.3% of all tonne-kilometres forwarded by foreign hauliers in the United Kingdom was carried by Polish hauliers.

The overall road transport performance in the EU-28, Norway and Switzerland remains underestimated, as the transport activities of non-EU hauliers (except those from Norway, Liechtenstein (until 2012) and Switzerland, which participate in the data collection) are not considered, as these are not reported to Eurostat.

Modal split based on five transport modes: road competes with maritime at intra-EU level

Figure 3 shows modal split calculated on the basis of transport performance, measured in tonne-kilometres, of five transport modes: road, rail, inland waterways, air and maritime. When adding intra-EU air and maritime transport to the inland modes, road still keeps its leading position, followed by maritime transport. In 2014, road accounted for half of all tonne-kilometres performed in the EU-28. Maritime transport came next, with around a third of the total transport performance, followed by rail (12.2%) and inland waterways (4.5%). In terms of tonne-kilometres performed, air transport plays only a marginal role at EU level, with a share of 0.1%.

Table 5 shows the transport performance in tonne-kilometres for the five transport modes road, rail, inland waterways, maritime and air for the period 2009-2014. The total intra-EU-28 transport performance by these five modes of transport increased by 5.3% during this period. Inland waterways and rail transport performance increased strongly over this period, by 15.6% and 13.0% respectively. There was also a considerable raise in the tonne-kilometres performed by maritime transport (8.4%). There were slight rises in transport performance also for road and air, but for both this increase amounted to less than 1% over period. Despite the importance of road to the total transport performance within the EU, this marginal increase in road transport compared to the other main transport modes explains to a certain extent the decrease in the relative share of road transport (-2.2 pp) and the simultaneous increase in the shares of maritime transport (1.0 pp) and rail transport (0.8 pp) from 2009 to 2014 (see Figure 3).

Data sources and availability

The sources for the statistics in this article are from Eurostat. Statistical data have been reported to Eurostat by EU Member States in the framework of various EU legal acts. The essential legal acts are the following:
However some uncertainty in the recording of the partner ports of loading or unloading may influence the results. In order to exclude double counting of the same goods being reported as inwards transport by one port and as the calculation of the maritime transp[routes taken by vessels. Multiplying tonnes transported between a pair of ports by the relevant distance has allowed tonne i.e. ports handling more than 1 million tonnes of goods annually. In order to calculate transport performance in between port pairs (port of loading and port of unloading). Nevertheless, these data cover only defined 'main ports', Within the framework of the relevant legal act, Eurostat collects maritime data of goods transporte[lication of the distances defined by the tool were revised in 2013 and were applied to the previous years. Re[visions were such that comparing statistics processed with the previous version of the tool would have resulted in a break in series. Therefore, data of the previous years have been re[culated and the declared tonne[kilometres (tran_hv_frmod) are not comparable with the currently existing table in Eurobase on 'Modal split of freight transport' (tran_hv_fmmod) due to conceptual differences for road transport. Road data used for the Eurobase table are reported on the basis of the nationality of the haulier, while road data used for this publication were computed according to the 'territoriality principle' in order to reach coherence across the modes of transport considered.

**Adjustment of road freight data according to the 'territoriality principle'**

Road freight transport, and particularly the part of international (including cross-trade) transport, needed to be 'territorialised' as it is reported by the countries on the basis of the nationality of the haulier, not on the basis of where the transport was carried out. For example, a haulier from the Netherlands might undertake a journey to Portugal. Though only a small part of this journey is in the Netherlands, the entire transport performance is accounted for by the Netherlands, as the vehicle carrying out the transport is registered there.

In order to calculate modal split shares on the basis of coherent data sets, as rail and inland waterways and road transport) are not comparable with the currently existing table in Eurobase on 'Modal split of freight transport' (tran_hv_fmmod) due to conceptual differences for road transport. Road data used for the Eurobase table are reported on the basis of the nationality of the haulier, while road data used for this publication were computed according to the 'territoriality principle' in order to reach coherence across the modes of transport considered.

It order to redistribute the tonne-kilometre data proportionally to the countries concerned by the journey, the ILSE tool (Index of Locations for Statistics in Europe) has been used. This tool allows the calculation of the total distance between the NUTS level 3 region of origin and the NUTS level 3 region of destination and breaks down the total distance into sections according to the countries in which this transport took place. With the help of this tool, the distances driven on the territories of the individual countries were calculated and the declared tonne-kilometres were proportionally attributed to the countries concerned. However, the likely routes used and their corresponding distances defined by the tool were revised in 2013 and were applied to the previous years. Revisions were such that comparing statistics processed with the previous version of the tool would have resulted in a break in series. Therefore, data of the previous years have been re-processed in order to ensure comparability and continuity. The consequence of this re-processing using the revised routes/distances is that the Modal Split figures published in an earlier Eurostat publication *Statistics in Focus 13/2012* have become obsolete.

Furthermore, transport performance of road freight journeys to non-EU countries (apart from EFTA countries) has not been taken into account. Therefore the cumulated values of the territorialised transport performance will always be lower than those declared in compliance with relevant EU legal acts. Some journeys have their origin or destination in regions that are not covered by the ILSE tool (which is notably the case for islands such as the Canary Islands, Madeira, etc). In such cases, the region of origin/destination have been given the NUTS 3 region code where the main freight ferry terminals are located in order to avoid further underestimation of the data.

Data on total road freight transport for the reference period 2005-2014, calculated on the basis of the territorialised international transport, are included as an annex in the Excel file downloadable under *Source data for tables and graphs* below.

**Calculation of tonne-kilometres for air and maritime freight transport**

Within the framework of the relevant legal act, Eurostat collects maritime data of goods transported in tonnes between port pairs (port of loading and port of unloading). Nevertheless, these data cover only defined 'main ports', i.e. ports handling more than 1 million tonnes of goods annually. In order to calculate transport performance in tonne-kilometres for maritime transport, Eurostat developed a distance matrix on the basis of the most likely sea routes taken by vessels. Multiplying tonnes transported between a pair of ports by the relevant distance has allowed the calculation of the maritime transport tonne-kilometres at the EU level.

In order to exclude double counting of the same goods being reported as inwards transport by one port and as outwards transport by another port within the EU, all such records that were identified in the data, were excluded. However some uncertainty in the recording of the partner ports of loading or unloading may influence the results.
Due to some degree of uncertainty in the outwards data, all outgoing goods with an ‘unknown’ partner port declared by some countries, have been excluded from the tonne-kilometres calculations on the assumption that this transport has been correctly reported as incoming goods by the partner country.

Similarly to maritime transport, Eurostat collects air transport data of cargo (expressed in tonnes) forwarded between airport pairs according to Regulation (EC) N°437/2003 of the European Parliament and of the Council of 27 February 2003 on statistical returns in respect of the carriage of passengers, freight and mail by air. The legal act defines categories of airports according to the passenger units handled per year. Passenger unit is equivalent to either one passenger or 100 kilograms of freight and mail. Three datasets are defined according to different concepts (‘Flight Stage’ dataset, ‘On Flight Origin Destination’ dataset, ‘Airport’ dataset). Air transport data used for the calculation of tonne-kilometres are based on the ‘Flight Stage’ concept. Air transport, analysed in this article covers transport to and from any airports in the reporting countries with more than 150 000 passenger units annually. In order to calculate transport performance in tonne-kilometres for air transport, Eurostat is using a distance matrix that contains great circle distances (minimum distance on a spherical line) between airport pairs.

Since inland freight transport (road, rail and inland waterways) is essentially performed on the territory of the European continent, it has been considered appropriate to limit maritime and air freight transport to national and international intra-EU28 transport. Thus, distortions in the overall picture of the European transport market, which would appear by including deep sea shipping and inter-continental air transport, are avoided.

Definitions of terms used within transport statistics are available in the transport glossary and in the 'Illustrated Glossary for transport statistics' (Fourth edition, 2009).

See the list of country codes.

**Context**

The European Commission’s Roadmap to a Single European Transport Area — Towards a competitive and resource efficient transport system White Paper, adopted in March 2011, states that the transport sector in the EU should use less and cleaner energy, and that there should be efficient networks. The White Paper adds that shifting to more environmentally sustainable modes of transport should be encouraged.

There is a need for EU-wide data to monitor progress towards this goal. Recording modal shifts over time is therefore very important, and enables policy guidelines to be tailored more accurately.

**See also**

- Freight transport statistics
- Transport statistics introduced
- Transport statistics at regional level

**Further Eurostat information**

**Publications**


**Main tables**

- Transport, see:
  - Transport, volume and modal split (t_tran_hv)

**Database**

- Transport, see:
  - Multimodal data (tran)
Transport, volume and modal split (tran_hv)

Dedicated section

- Transport

Methodology / Metadata

- Modal split of freight transport (ESMS metadata file — tran_hv_frmmod_esms)
- Modal split of passenger transport (ESMS metadata file — tran_hv_psrnmmod_esms)
- Volume of freight transport relative to GDP (ESMS metadata file — tran_hv_frrtra_esms)
- Volume of passenger transport relative to GDP (ESMS metadata file — tran_hv_pstrra_esms)

Source data for tables and graphs (MS Excel)

- Transport modal split - tables and figures, April 2016

Other information


External links

- European Commission - Transport - Marco Polo Programme
- Trans-European Network Executive Agency