


FREIGHT TRANSPORT BY ROAD

Session outline

- Group discussion
- Presentation
 - Industry overview
 - Industry and products classification
 - Sample selection
 - Data collection
 - Pricing methods
 - Index calculation
 - Quality changes adjustment
 - Weighting
 - UK experience
- Peer discussion

Group discussion: Freight transport by road

- What do you know about this industry?
- How important is this industry in your country?
- Is there any specific national characteristics to this industry (e.g. specific regulation, market conditions etc)?
- What do you think are the main drivers of prices in this industry?

Industry overview/1

- Main component of freight transport industry
- Includes businesses directly transporting goods via land transport (excluding rail) and businesses renting out trucks with drivers; removal services are also included.
- Traditionally, businesses focussed on road haulage only or having ancillary storage and warehousing services for goods in transiting

Industry overview/2

- More differentiation now, offering a bundle of freight-related services or supply-chain solutions including:
 - Freight forwarding
 - Packaging, crating etc
 - Cargo consolidation and handling
 - Stock control and reordering
 - Storage and warehousing
 - Transport consultancy services
 - Vehicle recover, repair and maintenance
 - Documentation handling
 - Negotiating return loads
 - Information management services
 - Courier services

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[See European Road Freight](#)[See Rest of World Road Freight](#)

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SAME DAY

Mission critical door-to-door delivery.

Definitions

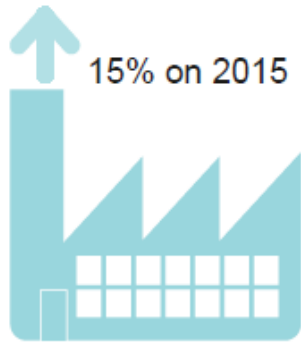
- Goods lifted: the weight of goods carried, measured in tonnes
- Goods moved: the weight of goods carried, multiplied by the distance hauled, measured in tonne-kilometres

Economic activity of the UK road freight sector

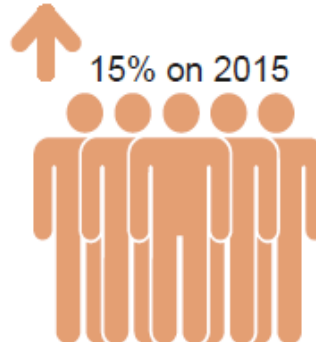
Road Freight Enterprises

Latest estimates from the [Annual Business Survey](#) show that in 2016 the road freight sector:

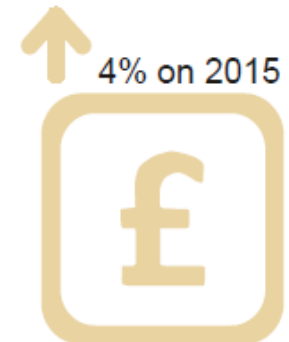
had 51,334 enterprises



had sector level employment
of 284,000 individuals



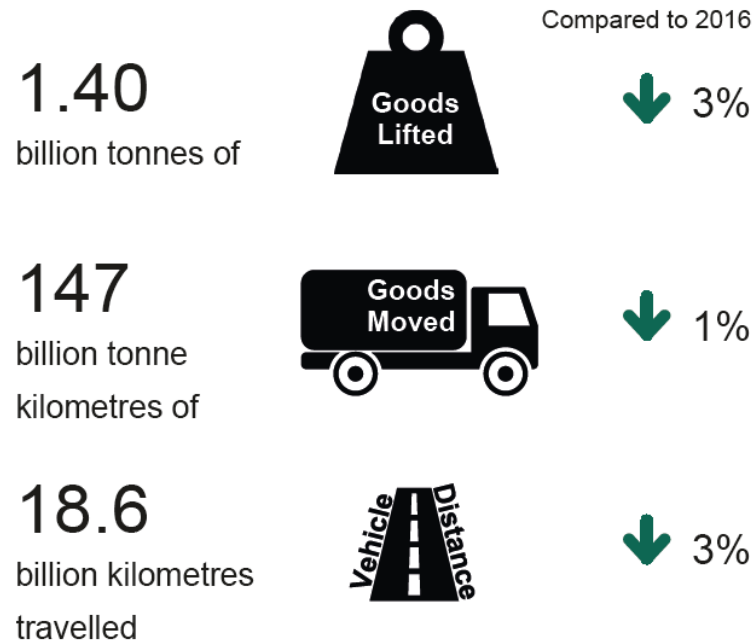
contributed £12.4 billion to
the UK economy.



UK road freight industry

Domestic road freight activity decreases in 2017

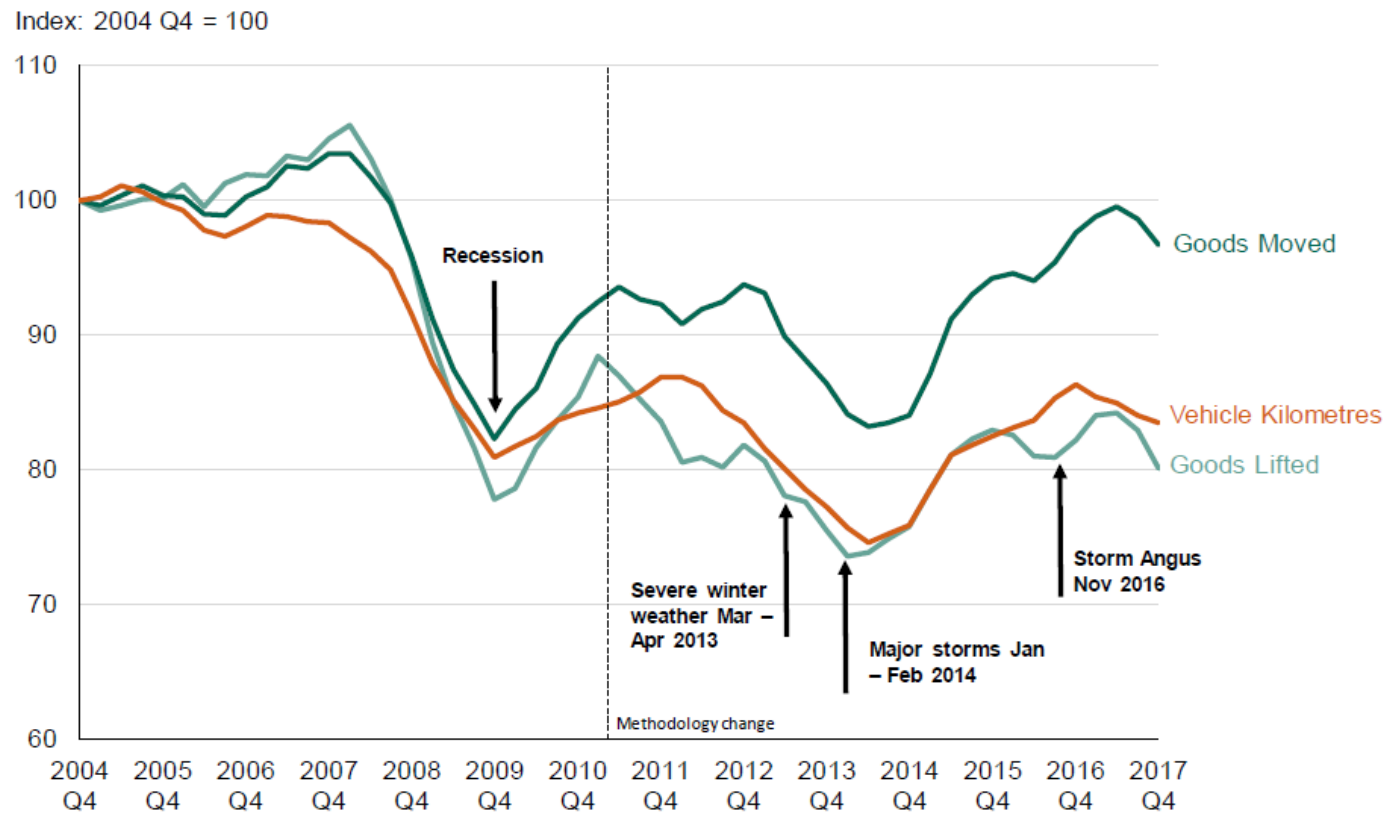
In 2017, for GB-registered HGVs there were...



Source: <https://www.gov.uk/government/statistics/road-freight-statistics-october-2017-to-september-2018>

UK domestic road freight – trends over time






Chart 1: Trend in goods moved, goods lifted and vehicle kilometres by GB-registered HGVs rolling 4 quarter totals, 2004 Q4 to 2017 Q4, indexed to 2004 Q4 [[Table RFS0101](#)]



Commodities transported

Commodities

In 2017, the 5 most common commodity divisions (representing 65% of all goods) lifted by GB-registered HGVs in the UK were: [\[Table RFS0104\]](#)

Rank	Commodity	Goods lifted (million tonnes)	Proportion of all goods lifted
1	 Food products	287	21%
2	 Metal ore and other mining and quarrying	195	14%
3	 Waste related products	153	11%
4	 Glass, cement and other non-metallic mineral products	135	10%
5	 Groupage	129	9%

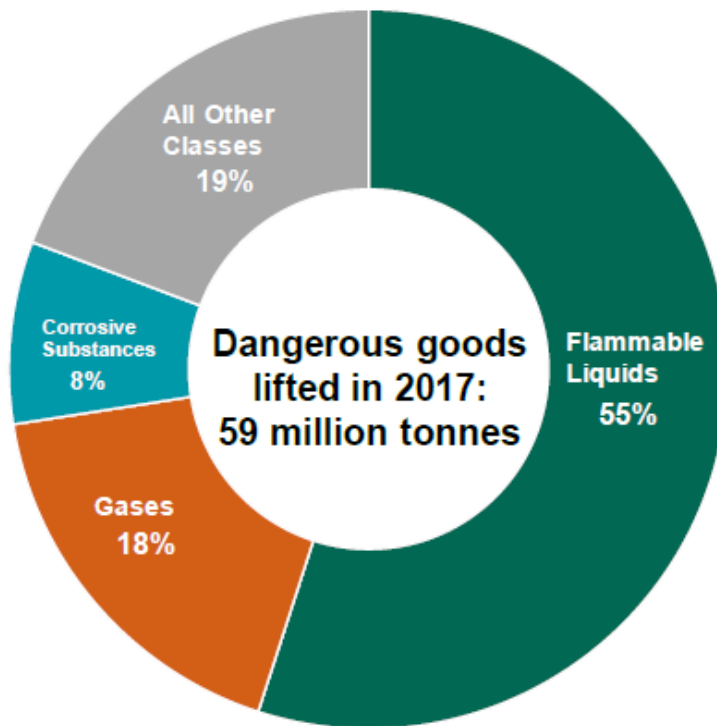
Definitions

Commodity: goods are classified into commodity divisions and groups by the 'standard goods classification for transport statistics 2007'.

Groupage: when, for mixed consignments, no single commodity makes up 75% or more of the consignment weight.

Dangerous goods

Chart 3: Dangerous goods lifted by GB-registered HGVs by dangerous goods class, 2017 [[Table RFS0118](#)]

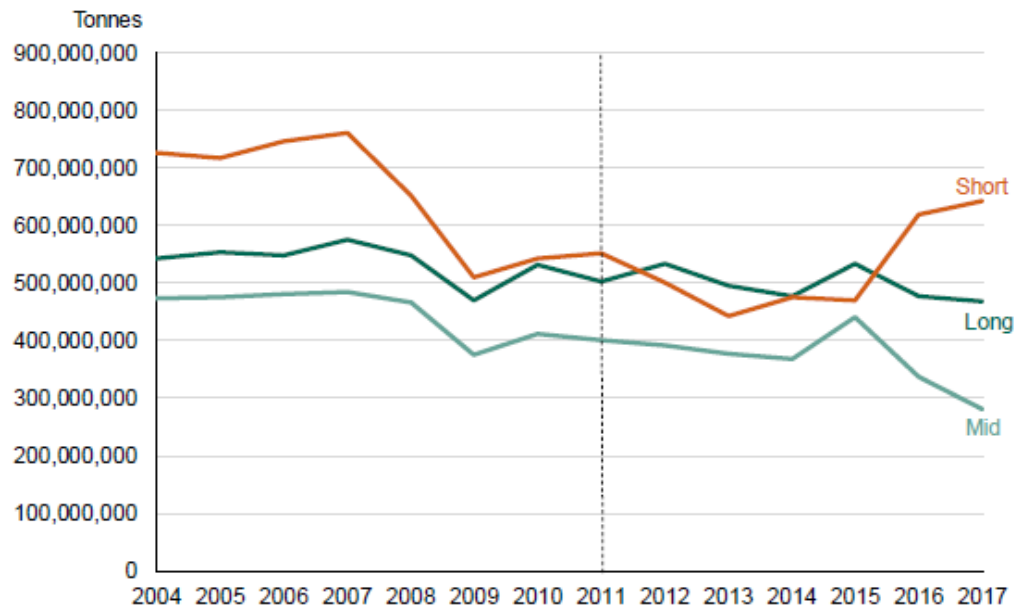


The 9 dangerous goods classes

- Explosives
- Gases
- Flammable liquids
- Flammable solids
- Oxidisers & organic peroxides
- Toxic & infectious substances
- Radioactive materials
- Corrosive substances
- Miscellaneous substances

Origin and destination

Chart 6: Volume of goods lifted by GB-registered vehicles by length of haul

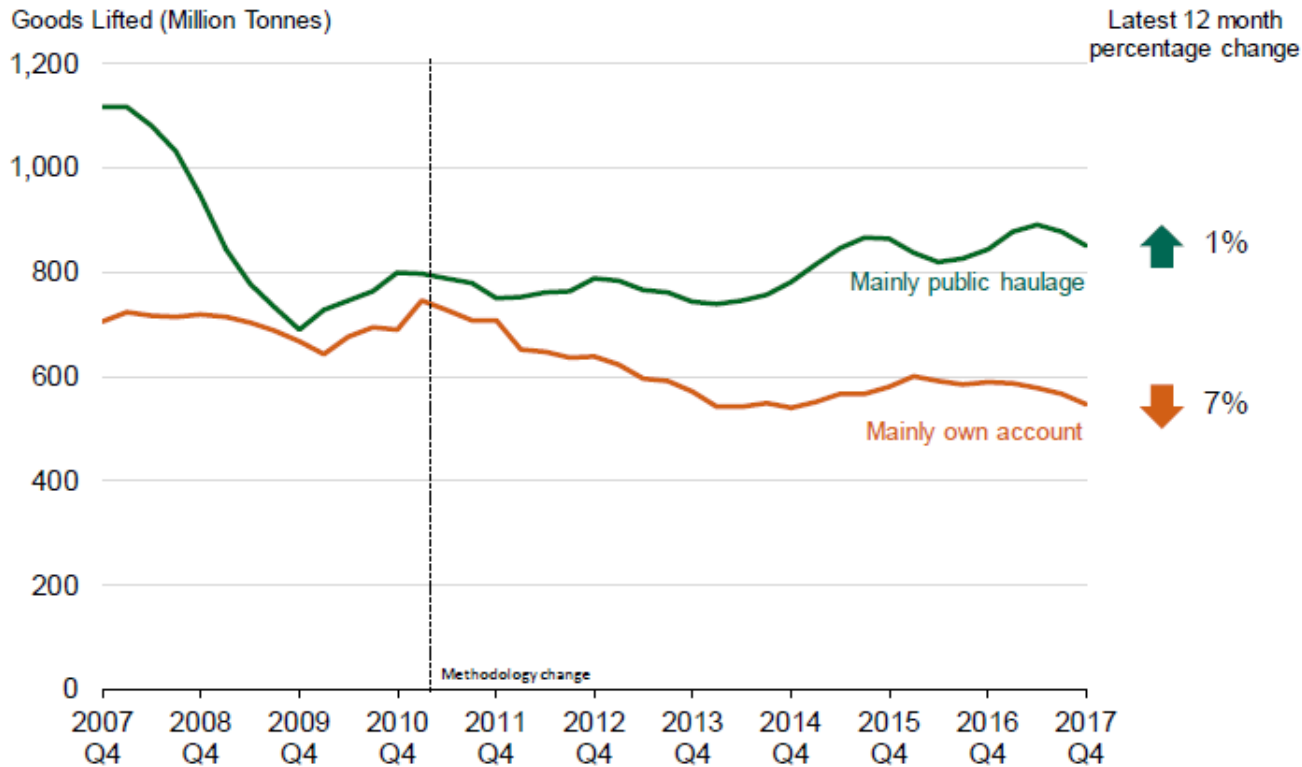


Definitions

For the purpose of Chart 5, a **long haul** is where the goods lifted move between two different NUTS1 regions. **Short hauls** are where the goods lifted remain within the same NUTS 3 region. **Mid-length hauls** are where the goods change NUTS3 region, but remain in the same NUTS1 region.

Mode of operation

Chart 8: Goods lifted by GB-registered HGVs, by mode of working, 2007 Q4 to 2017 Q4 [[Table RFS0114](#)]



Definitions

Own account operators: those who carry goods only for their own trade or business.

Public haulage operators: those who carry goods for other companies or individuals.

Intermodal trips

Of (155 million) HGV journeys within the UK in 2017, 2% (3.4 million journeys) involved inter-modal activity. This equates to 59 million tonnes of freight (4%) using at least two different modes of transport, **of which:**



89% of inter-modal journeys (56 million tonnes) began or ended at a shipping dock



8% of inter-modal journeys (2 million tonnes) began or ended at an airport



2% of inter-modal journeys (2 million tonnes) began or ended at a rail siding/terminal

Percentages may not sum to 100%

Definitions

Inter-modal:

There are multiple nuanced definitions of journeys involving freight movement across modes. Solely for the purpose of these statistics, these types of journeys and freight involved shall be referred to as “Inter-modal” freight.

Journey: goods transported from an origin to a destination by an HGV.

Method of transportation definitions can be found on page 11.

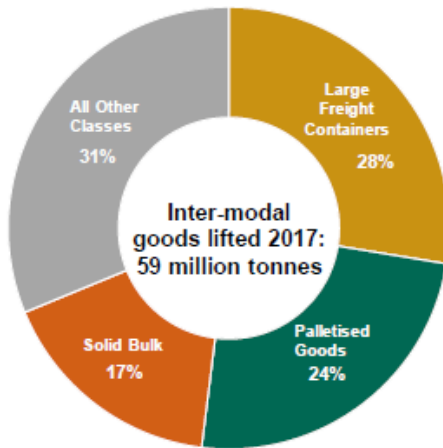
Commodities

The three most common commodities transported on inter-modal trips in 2017 were:

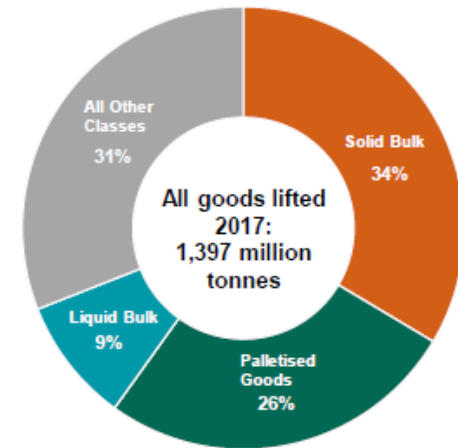
- ▶ Food products 9.1 million tonnes (16% of inter-modal tonnage)
- ▶ Chemical products 6.4 million tonnes (11% of inter-modal tonnage)
- ▶ Groupage 5.5 million tonnes (9% of inter-modal tonnage)

Intermodal transportation

Method of transportation



The receptacle or method used to transport goods differs between all goods lifted and inter-modal goods reflecting the needs involved when transferring goods between



Definitions

Methods of Transportation:

Solid Bulk – commodity transported unpacked in large quantities. It refers to material in granular form e.g. coal

Liquid Bulk – similar to solid bulk, however the material it refers to is of liquid form e.g. petroleum/crude oil

Palletised Goods – commodity transported in a pallet, to support goods giving stability to commodity during transportation e.g. beverages

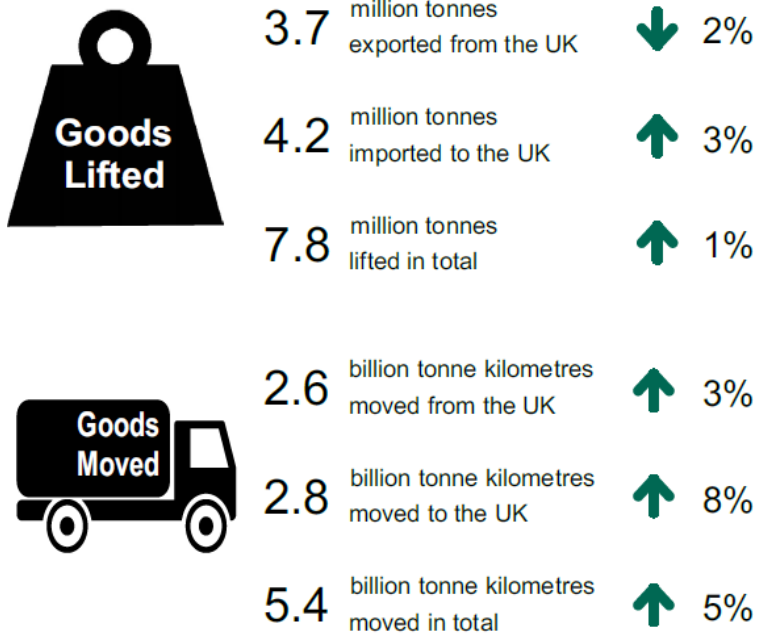
Large Freight Containers – also known as shipping containers, commodity transported in a container with strength suitable to withstand shipment, storage and handling e.g. large reusable steel boxes (intermodal shipments), corrugated boxes

International road freight activity

The UK's international road freight activity increased in 2017

In 2017, for UK registered HGVs transporting freight internationally there were...

Compared to 2016



Goods lifted in 2017, origin and destination:

Exports from the UK to



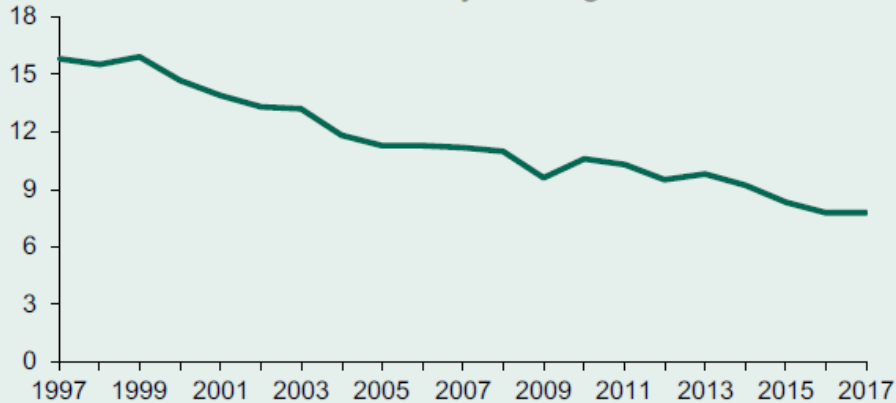
Imports to the UK from



International road freight

International road freight [TSGB0411 \(RFS0202\)](#)

Goods lifted to/from the UK, by UK-registered HGVs internationally: 1997 to 2017 (million tonnes)



7.8
million
tonnes
lifted



5.4 billion
tonne
kms
moved

Percentage changes from 2016:

↑ 1%

↑ 5%

Industry classifications

ISIC Rev.4		NACE Rev.2		2007 NAICS		ANZSIC	
H	Transportation and storage						
49	Land transport and transport via pipelines						
492	Other land transport						
4923	Freight transport by road	49.41	Freight transport by road	484110	General Freight Trucking, Local		
				484121	General Freight Trucking, Long-Distance, Truckload		
				484122	General Freight Trucking, Long-Distance, Less than Truckload		
		49.42	Removal services	484210	Used Household and Office Goods Moving		
				484221	Bulk liquid trucking, Local		
				484222	Dry bulk materials trucking, Local	61100	Road Freight Transport
				484223	Forest products trucking, Local		
				484229	Other specialised freight (except Used Goods) Trucking, Local		
				484231	Bulk liquids trucking, long distance		
				484232	Dry bulk materials trucking, long distance		
				484233	Forest products trucking, long distance		
				484239	Other specialised freight (except used goods) trucking, long distance		

Source: OECD/Eurostat (2014), *Eurostat-OECD Methodological Guide for Developing Producer Price Indices for Services: Second Edition*, OECD Publishing. <http://dx.doi.org/10.1787/9789264220676-en>

Product classification

ISIC Rev. 4		CPC Ver.2		CPA 2008	
H	Transportation and storage				
49	Land transport and transport via pipelines				
492	Other land transport				
4923	Freight transport by road	65111	Road transport services of freight by refrigerator vehicles	49.41.11	Road transport services of freight by refrigerator vehicles
		65112	Road transport services of freight by tank trucks or semi-trailers	49.41.12	Road transport services of freight by tank trucks or semi-trailers, petroleum products
		65113	Road transport services of intermodal containers	49.41.13	Road transport services of freight by tank trucks or semi-trailers, other bulk liquids or gases
		65114	Road transport services of freight by man- or animal-drawn vehicles	49.41.14	Road transport services of intermodal containers
		65115	Moving services of household and office furniture and other goods	49.41.17	Road transport services of freight by man- or animal-drawn vehicles
		65116	Road transport services of letters and parcels	49.42.11	Removal services for households
		65117	Road transport services of dry bulk	49.42.19	Other removal services
		65118	Road transport services of live animals	49.41.18	Road transport services of letters and parcels
		65119	Other road transport services of freight	49.41.15	Road transport services of dry bulk goods
		66012	Rental services of trucks with operator	49.41.16	Road transport services of live animals
				49.41.19	Other road transport services of freight
				49.41.20	Rental services of trucks with operator

CPA 2008	
49.41.1	Freight transport services by road
49.41.2	Rental services of trucks with operator
49.42	Removal services

UK classification

- Existing road freight index split in 7 sub-indices:
 - Agriculture and livestock
 - General haulage
 - International haulage
 - Road tankers
 - Road temperature controlled transport
 - Tipping and construction
 - Warehousing and distribution
- Moving to CPA 2.1 classification later this year
- Removal services (49.2) are not captured – account for only 3.5% of the overall “Freight transport by road” industry




Key classification considerations

- Industry or product classification?
- Type of goods transported
- National or international transport
- National characteristics of the industry

Industry or product classification

- For NA purposes, product is ideal
- Practically, the choice between industry or product classification needs to take into account the diversification of outputs within each industry
- How important is “off-diagonal” turnover?

	Industry 1	Industry 2	Industry 3	Industry 4	Industry 5
Product 1	On-diagonal		Off-diagonal		
Product 2		On-diagonal	Off-diagonal		
Product 3			On-diagonal		
Product 4			Off-diagonal	On-diagonal	
Product 5			Off-diagonal		On-diagonal
Total			Total industry turnover		

-  On-diagonal: products produced **inside** a business's main industrial classification
-  Off-diagonal: products produced **outside** a business's main industrial classification
-  Total industry turnover: the sum of on-diagonal and off-diagonal turnover

Off-diagonal turnover...Annual Survey of Goods and Services (ASGS)

Figure 1: Percentage of total turnover by industrial section in 2016

UK

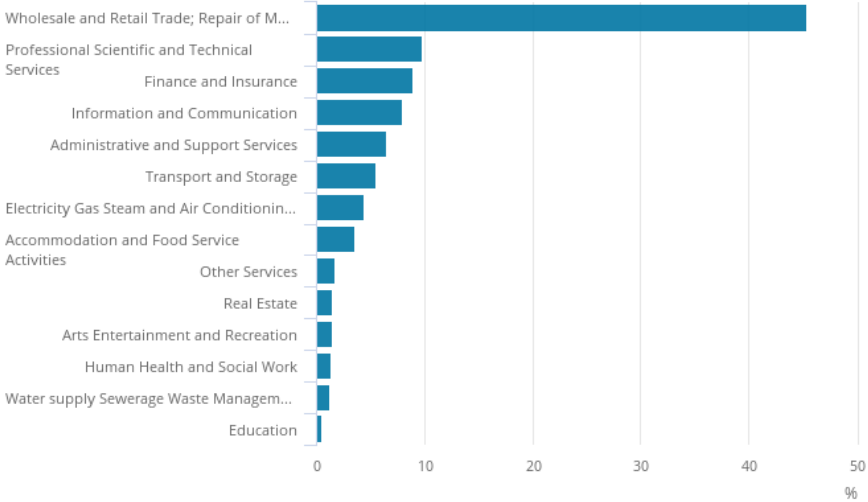
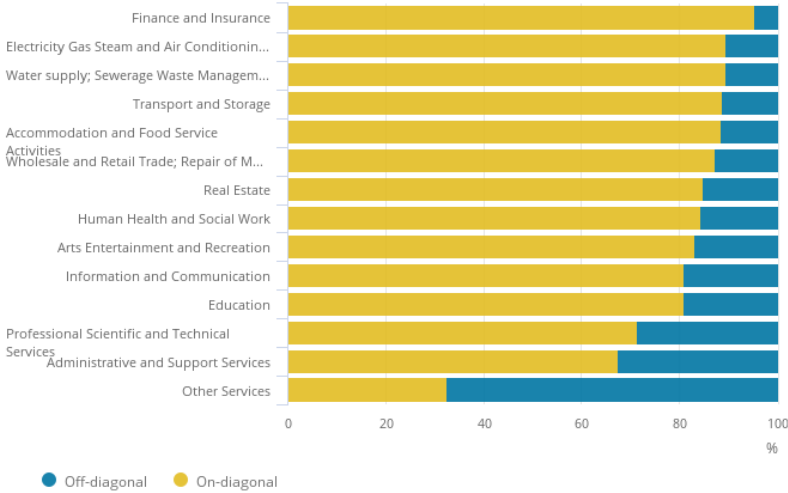


Figure 3: Percentage of on-diagonal and off-diagonal turnover in 2016, section products

UK



Source: Annual Survey of Goods and Services 2016, Office for National Statistics

Source: Annual Survey of Goods and Services 2016, Office for National Statistics

Road freight transport industry and products

- Sizeable proportion of industry-level turnover is generated from products that are classified outside division 49
- This reflects the diversification of activities within the road freight industry, with growing importance of ancillary activities such as storage and warehouse, as well as inter-modal transport
- Similarly, a sizeable proportion of product-level turnover is generated in industries that are classified outside division 49
- Importance of capturing “off-diagonal” turnover for this industry

Scope of survey and challenges

- Industry dominated by business-to-business (B2B) activity
- Bundled activities and large share of secondary activities
 - Additional supply chain services (storage, warehousing and freight forwarding)
 - Intermodal transport
 - Difficulty to isolate the road transport component
- Subcontracting is common

Data collection

- Survey or alternative data sources (e.g. web-scraped data/admin records)
- Probabilistic sample
- PPS – probability proportional to size (turnover or employment)
- Non-probability sampling may be applied to capture key service producers
- Stratification to improve efficiency – consideration to be given to classification/ industry national characteristics
- Some typical stratification variables:
 - Size
 - Region
 - Type of goods transported
 - Type of bundled/ancillary activities

UK sample

- Data is collected via a quarterly survey, similarly to the rest of the transportation and storage industry
- Sample is selected from the Services Turnover Survey using a Probability Proportional to Size sample design
- Plan to move to use ASGS as SPPI sampling frame – this will allow sampling services at 6-digit CPA level

Service specification

- As detailed as possible to control quality changes
 - Type of vehicle
 - Type and weight of cargo
 - Journey distance
 - Routing information (distribution/joint cargo)
 - Delivery time
 - Return cargo
 - Inclusion/exclusion of packing, loading and unloading services
 - Name and customer-status of customer
 - Domestic or export
 - Other special conditions

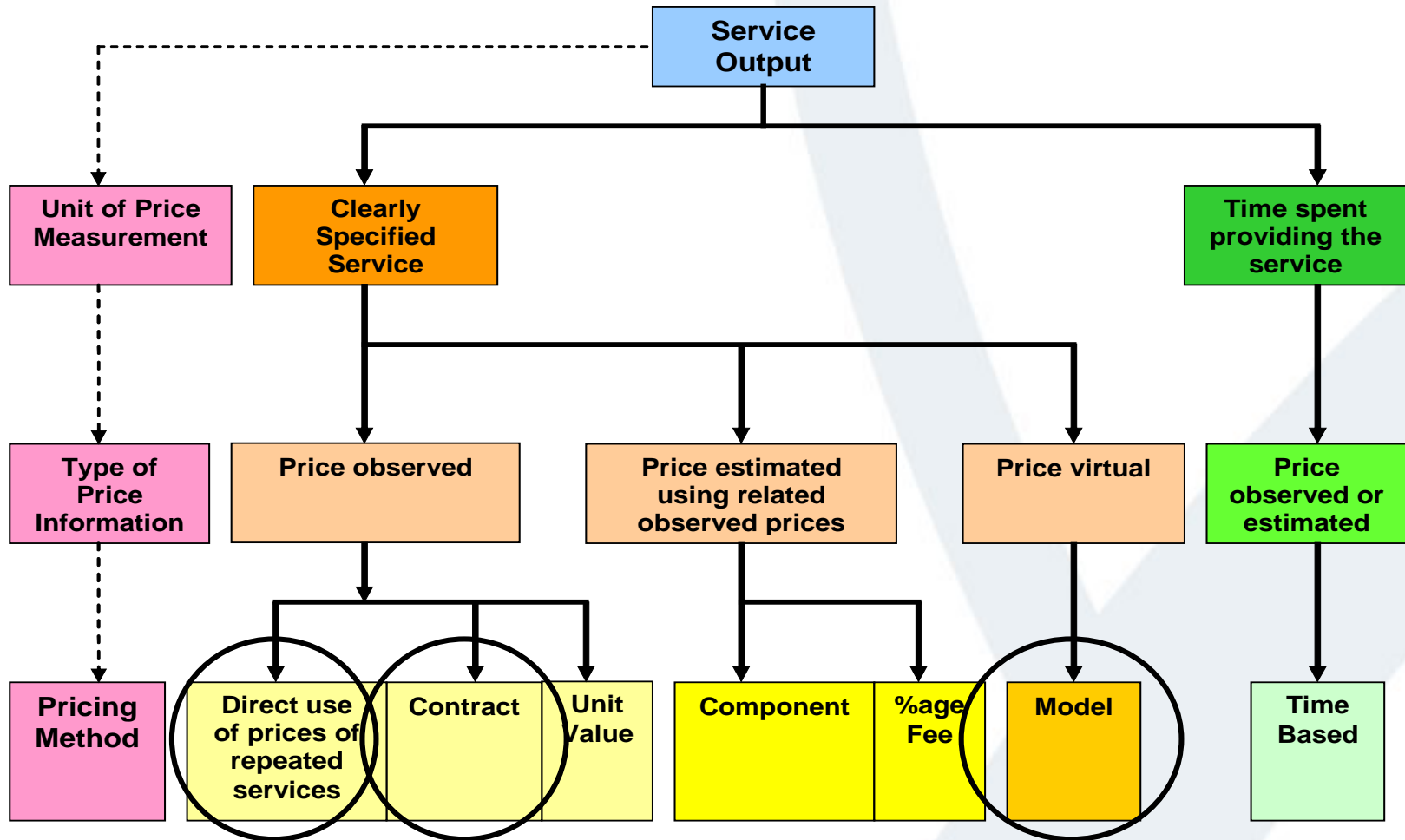
Example of road freight service specifications

- *Service 1*
 - Transportation of general goods*
 - 4 tonne articulate vehicle*
 - Cardiff to Bristol*
 - Price per journey*
- *Service 2*
 - UK*
 - Temperature controlled transport with chilled trailer*
 - Price per pallet*
 - Price including storage*
- Service specifications are tailored in discussions between the respondents and ONS dedicated recruitment team. The specifications are then included in each questionnaire

Pricing methods

- Need to understand more common pricing mechanisms within the industry:
 - Type of cargo
 - Distance
- Long-term/repeated contracts or “spot hire”/one-off rates

Pricing methods: freight transport by road



Contract pricing

- Price for repeated delivery of same (or very similar) service
- Respondents provide price for same service as set out in long-term contracts

Pros:

- Real transaction price
- Captured discounts
- Least compliance cost
- Basic price can be identified

Cons:

- Under-representation of one-off/spot market and smaller respondents

List prices – direct use of prices of repeated services

- List prices: published prices for services
- Normally rates based on mileage, weight, volume etc
- Starting point to agree contract or spot prices

Pros:

- More appropriate for smaller respondents
- Clear and published pricing mechanism
- Limited respondent burden

Cons:

- Not a real transaction price – discounts not known

Model pricing

- Representative standard model service is identified and respondent asked to price this over time
- Suitable when a real price for a service has been provided in the base period but the service is not provided on a regular, ongoing basis

Pros

- Suitable for ad-hoc, one-off or irregular trips
- Producers specialised on the spot market
- Grouped cargo where quantity and type of cargo varies over time
- Transportation of heavy/exceptional loads

Cons

- Not real transaction prices
- Higher compliance cost
- Maintenance of representative model services over time

UK experience

- UK SPPI generally uses direct use of prices of repeated services or contract prices
- Not specifically prescriptive to respondents on what method to use as long as prices refer to the same type of service as specified during recruitment/validation discussions

Data validation

- As for other industries, based on unexpected price changes
- Aims at detecting non-genuine price changes
 - Data collection errors
 - Changes in quality
- Validation gates applied on period-on-period growth
 - e.g. validation failures where quarter-on-quarter prices change over a certain threshold (e.g. 7.5%; 15%)
- Validation gates should take into account industry-specific price characteristics:
 - Volatility/price variability
 - Seasonality
- Cases failing validation are contacted by Business data division staff to query large movements

Drivers of price movements

- Cost of petrol key determinant in price movements in the transport industry
- Other price drivers include congestion, labour shortages, safety and security issues, working time regulations, maintenance costs for lorry/trailers, etc

Quality adjustments

- Necessary when contract discontinued or service not more representative of company's activity
- Contract discontinued but service representative: a close replacement should be identified (match-models)
- Service not more representative: a new representative and repeatable service needs to be identified
- Change of service needs to be dealt with carefully to ensure it still fits within the same index/stratum used for sampling

Change of services

- **Example 1.** Company BBB has a 2 years contract with a flower producer to transport flowers on a weekly basis from its fields to an airport for exporting. The contract is discontinued, but the company continues to provide a flower transport service and has a contract with another client to transport flowers to a port.

This contract can be used as replacement. A quality adjustment may have to be applied.

- **Example 2.** Company XYZ has stopped to transport flowers and is now only transporting livestock. The flower transport service is not anymore representative of the company's activity

New service still fits within index description. The new service can be used as a replacement with a quality adjustment applied to it

- **Example 3.** Company FFF has refocussed its activity from domestic to international haulage.

New service cannot be used as a replacement as it does not fit within the index description. Service will drop from the sample

Quality adjustment methods

- Overlap method

A price for the new service/contract is provided for both the current and previous period. This allows the new service or contract to be linked on the old one e.g.

- Class mean imputation

If the price for the new service is not available at time $t-1$, the average price change of similar items between $t-1$ and t is used to link the new service to the previous service

- Expert judgement

SPPI UK quality adjustments

- Managed via “specification changes”
 - Non-comparable/new service (carry forward)

The Price Relative is left unchanged at the time of the specification change and the price of the new service becomes the new base price
 - Partially comparable service (overlap method)

The Price Relative is adjusted to reflect the change in price only, without taking into account the effect of the specification change
 - Comparable service (comparable replacement)

The Price relative reflect the full change in price, as the change in specification is regarded as cosmetic only

Non comparable/new service

- New service – carry forward method (e.g. stop transporting flowers and transporting livestock only)

Base price (old service)=£100

Price(t-1, old service)=£120

Price(t, new service)=£1000

Price(t+1, new service)=£1300

PR(t-1, old service)=(£120/£100)*100=120

PR(t, new service)=120

PR(t+1, new service)=(£1300/£1000)*100=130

Underlying assumption is that the price of the old service would have been the same at time t-1 and time t

Partially comparable service

- Overlap method (e.g. route change in contract)

Base price (old service)=£100

Price(t-1, old service)=£120

Price(t, old service)=£150

Price(t, new service)=£1000

Price(t+1, new service)=£1300

PR(t-1, old service)=(£120/£100)*100=120

PR(t, old service)=(£150/£100)*100=150

PR(t, new service)=150

Base price (new service)=£1000*100/150=£667

PR(t+1, new service)=(£1300/£667)*100=195

Necessary to know what the price at time t of the old service would have been. This can be obtained by conversation with respondent or estimated by using class mean imputation

Comparable replacement

- Changes are considered cosmetic only (e.g. service transporting a different type of flowers)

Base price (old service)=£100

Price(t-1, old service)=£120

Price(t, new service)=£1000

Price(t+1, new service)=£1300

PR(t-1, old service)=(£120/£100)*100=120

PR(t, new service)=(£1000/£100)*100=1000

PR(t+1, new service)=(£1300/£100)*100=1300

Base price does not change

Weights

- Sampling weights
- Index to index weights/Turnover weights
 - Product weights
 - Industry weights

Sampling weights

- Inverse of selection probability
- Used to account for the specific sample design of a survey
- Applied at the lowest level of data collection – supplier/price quote/item
- If quotes/items selected not according to a probabilistic sample design, unweighted averages will have to be used

Turnover weights

- They allow indices to be created by consecutive aggregation of lower level indices
- Turnover weights or sales need to be available at the lowest level of classification used in the index (e.g. CPA 6 digit)
- If low-level turnover weights are not available, sales may need to be broken down using other data or expert judgement
- If indices are chainlinked, price updating of turnover figures may be required

Product weights

- Used to produce SPPI representative of the price movements of **specific products**
- Based on turnover data by product
- In the UK, we used to run a quinquennial surveys collecting specifically product-level turnovers to use in SPPI, the Services Turnover Survey (STS)
- STS was completely aligned to the UK SPPI bespoke classification
- A new survey, the Annual Survey of Goods and Services, is currently collecting this information for SPPI. This is based on the CPA 2.1. classification

Industry weights

- Used to produce SPPI representative of price movements of an industry
- Based on turnover data by industry
- Often more easily available than turnover by product via short-term or annual turnover surveys

UK weights -current

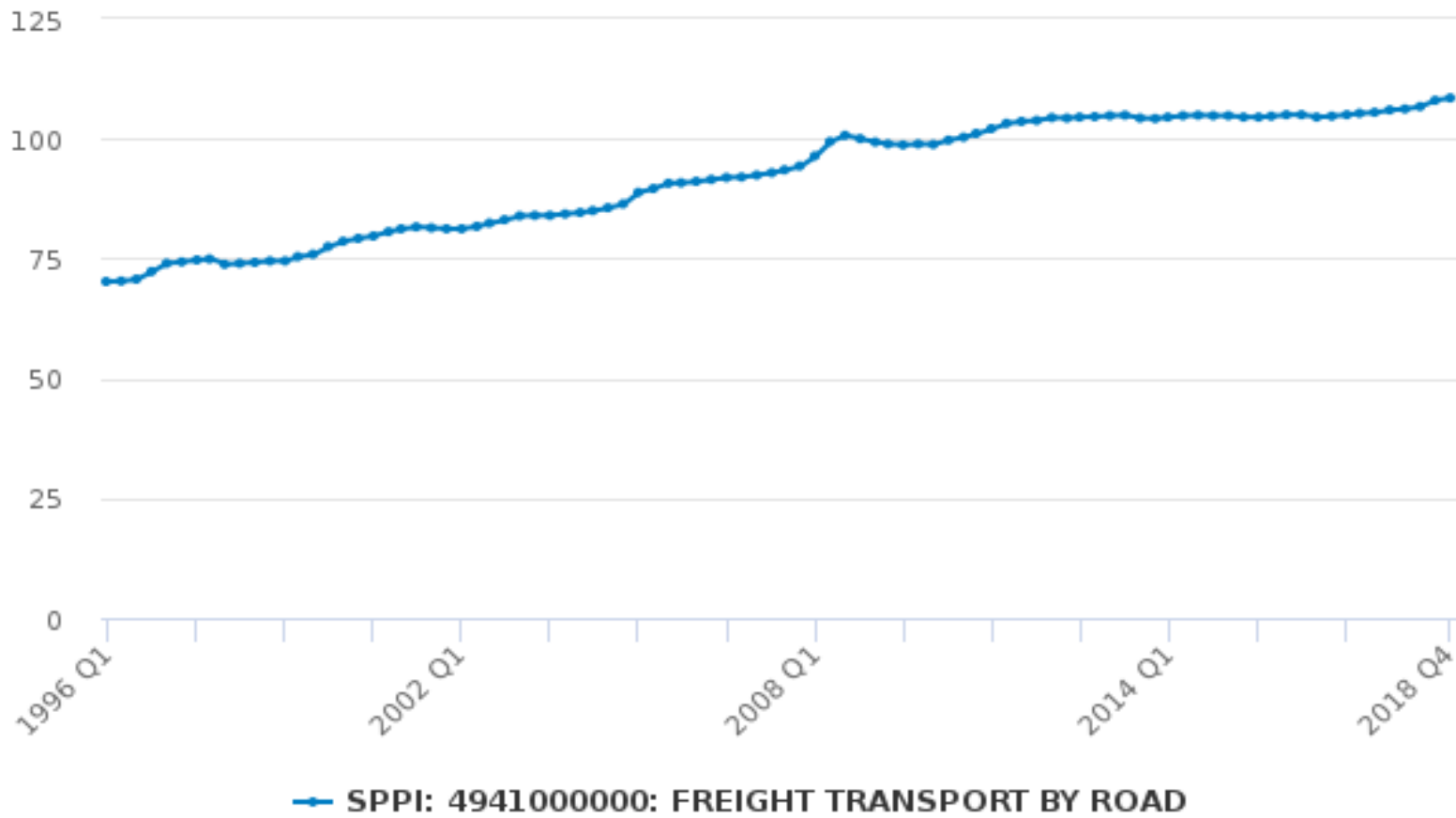
- STS provided product-level turnover for SPPI index-to-index weighting.
- STS tailored to SPPI needs:
 - Bespoke SPPI classification
 - Product-level turnovers for main products in each industry
 - Business-to-businesses turnovers
- Historically, both PPI and SPPI have been re-based and re-referenced every 5 years
- Currently referenced to 2010=100, with 2010 weights
- European regulations require re-basing taking place at time $t+3$
 - i.e. 2015 base weights should be introduced in 2018

Uk weights – near future

- From later this year (2019), we will be using ASGS data for SPPI weighting
- Work underway to move to annual chainlinking. This means that the weights will be updated every year

UK SPPI

SPPI: 4941000000: FREIGHT TRANSPORT BY ROAD



Source:

Group discussion

- Do you currently have an SPPI available for this sector?
- Any specific strengths/issues with existing SPPI?
- Any challenges in developing a new SPPI for this sector if not available?

Some aspects to consider:

- Any specific characteristic of the national industry/regulation etc
- Survey versus alternative data sources
- Sampling frame availability, advantages and limitations
- Sources of turnover data (industry/product)
- Specific user needs in terms of outputs