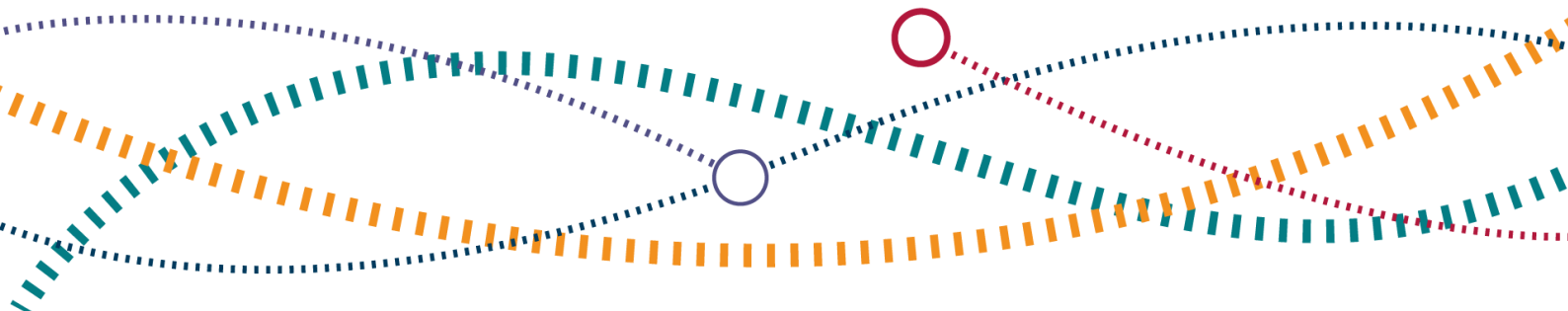




Report on rail industry productivity

23 March 2026



Contents

Executive Summary	3
1. Introduction	12
2. Industry wide productivity	14
3. Passenger operator metrics	18
4. Freight operator metrics	27
5. Infrastructure manager metrics	33
6. Total Factor Productivity in rail	43
Annex A: Summary of all metrics	51
Annex B: Passenger operator comparisons	52
Annex C: Methodology	53

Executive Summary

Understanding productivity is key to understanding the overall performance of the rail industry. Passenger growth, combined with efficiency gains, play a vital part in the recovery of industry finances following the pandemic as well as supporting growth in the wider economy.

This is our third publication on rail productivity, following on from our last report published in March 2025, and our discussion paper in 2024. As this year's report shows, passenger numbers have now largely recovered from the pandemic, with costs starting to stabilise. Broadly this means that the productivity of the railway continues to recover, with a steady improvement year on year.

We have made two improvements to our report this year in response to feedback received on our 2025 report.

First, we have included a new chapter on Total Factor Productivity (TFP), following an independent study we commissioned last year. This complements the 'partial' productivity measures we previously used. TFP accounts for all inputs at the same time, reflecting the efficiency with which labour and capital can be combined.

Second, we have improved our measurement of industry outputs, with train kilometres now subject to quality adjustments, for both 'on time to 3 minutes' performance, and rolling stock experience (using rolling stock age). This change enables a more nuanced understanding of rail industry outputs.

As noted in our previous reports, there are several ways to approach the measurement of productivity in the railway, with debate around the right measure of inputs and outputs. For example, we recognise that passenger and freight usage patterns — particularly during the pandemic — reflect structural changes outside the industry's control but still influence many of our metrics. In addition, long lead times mean that current spending, such as multi-year infrastructure investments, may not deliver productivity benefits until future years.

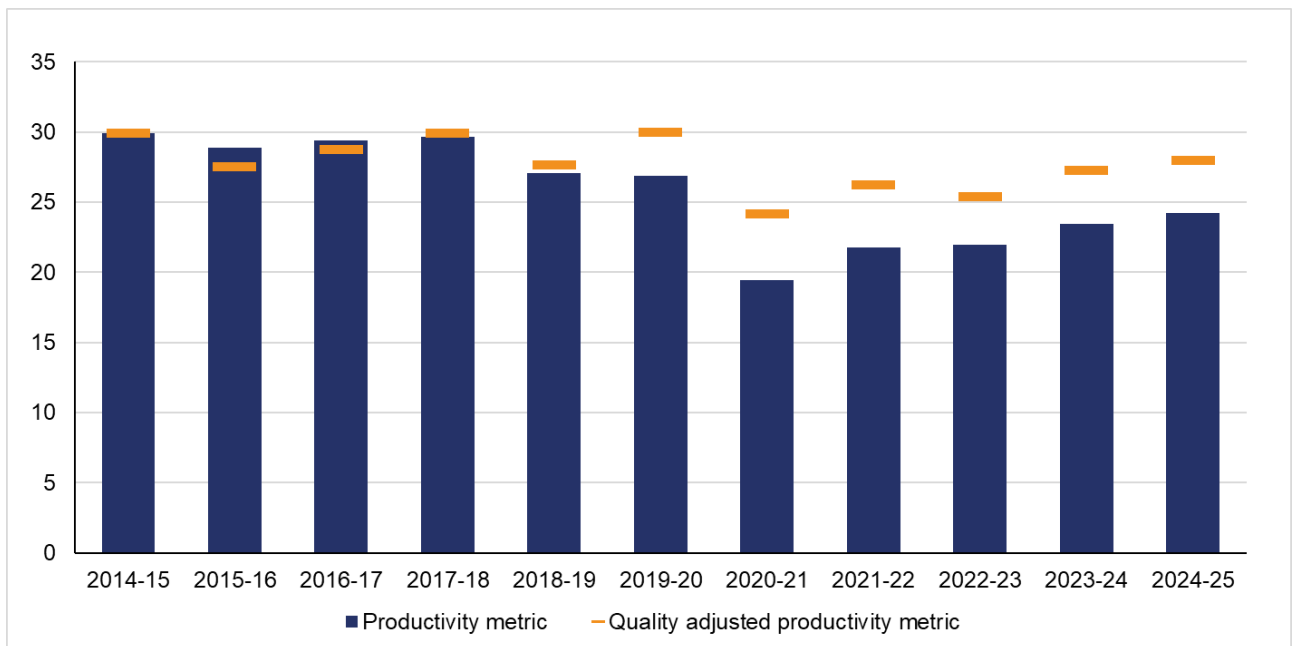
We will continue to refine our analysis and welcome comments on this year's report.

Key findings

Rail industry productivity again improved on last year but remains below pre-pandemic levels

Based on our quality adjusted partial productivity measures, rail industry productivity improved by 3% in 2024-25, but remains 6% below a decade ago.

Figure 1: Passenger and freight train kilometres per thousand pounds of industry expenditure



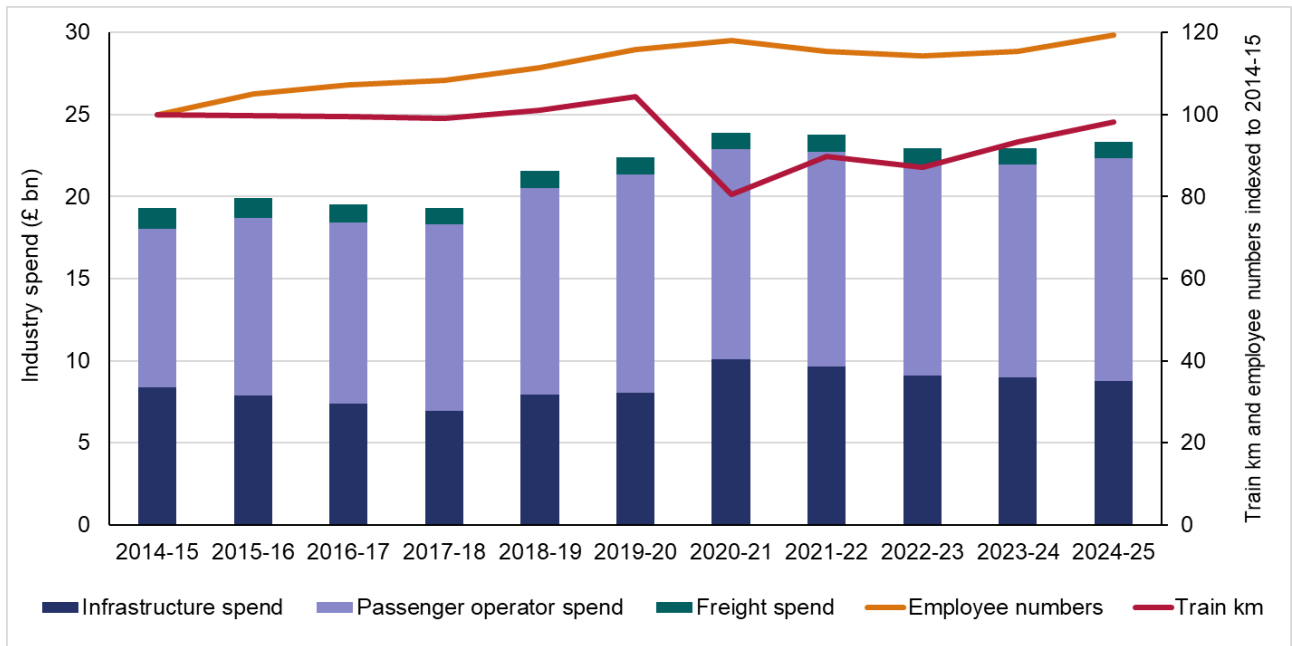
All expenditure values have been adjusted to 2024-25 prices.

Passenger journeys on the railway increased by 7% and train kilometres grew 5% in 2024-25 compared to the prior year. The railway industry has been steadily recovering from the impact of the pandemic and increases in train kilometres have been the main driver of improving productivity as shown in the chart below.

Costs have been broadly stable over the past year. However, total industry spend is 21% higher than a decade ago (in real terms), and government funding — although gradually falling — remains well above pre-pandemic levels.

Cost trends differ across the industry. Infrastructure costs are 5% above 2014-15 levels but passenger operator costs have risen by 40% over the same period, driven largely by investment in new rolling stock.

Figure 2: Key drivers of whole rail industry productivity



All expenditure values adjusted to 2024-25 prices.

Passenger operator productivity is similar to last year but remains below pre-pandemic levels, despite investment in rolling stock

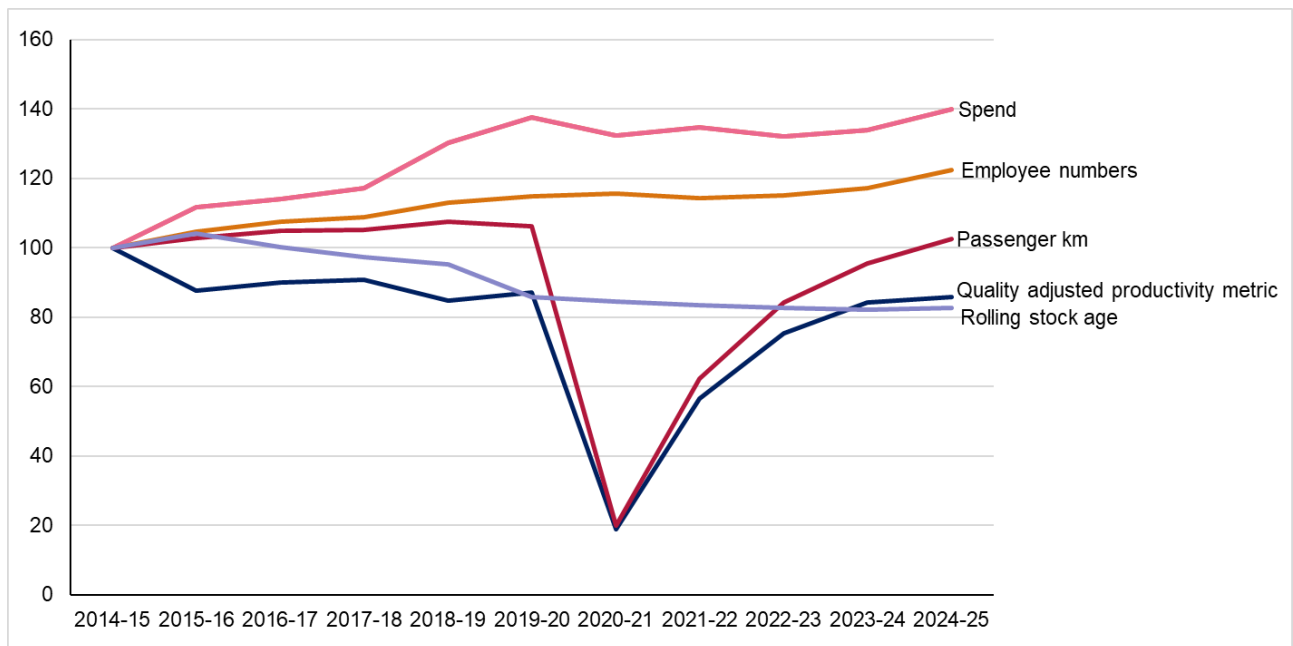
Our quality-adjusted partial productivity measures for passenger operators show that productivity — measured as passenger kilometres per pound of operator spend — has risen by 2% since 2023-24 but remains 14% below 2014-15. Productivity measured as passenger kilometres per operator employee shows a similar pattern.

There are over 15,000 passenger rolling stock vehicles on the UK rail network, which last year cost the industry £4.1 billion (16% of total industry expenditure, 31% of passenger operator spend). This was largely for leasing costs and vehicle maintenance.

The rail industry, in partnership with government, has recently made a series of investments in new rolling stock and the number of vehicles on the network has increased by 20% over the last decade (partly due to new operators entering service e.g. on the Elizabeth Line). Newer, more expensive fleets are used less intensively and are carrying fewer passengers per vehicle than a decade ago. This has increased costs but reduced the average age of rolling stock by 17% since 2014-15, improving passenger comfort and experience.

The increase in expenditure also reflects increased train operator staff with employee numbers steadily increasing to 23% higher than in 2014-15.

Figure 3: Drivers of passenger operator productivity, indexed to 2014-15



All expenditure values adjusted to 2024–25 prices. The quality adjusted metric is calculated as passenger kilometres per pound of spend, with adjustments for rolling stock age and punctuality. Punctuality is calculated as 'time to 3' minutes for passenger operators.

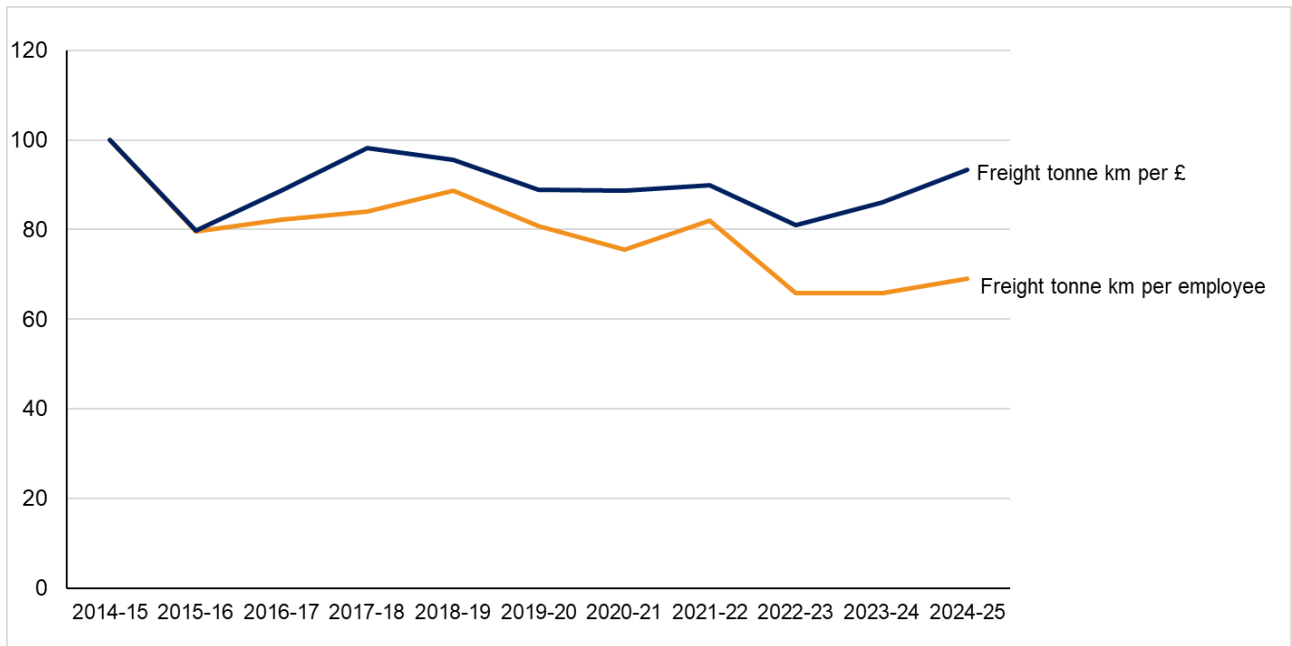
Freight operator productivity has improved since last year, but remains below pre-pandemic levels following a decline in freight tonnes transported

Our partial productivity measures indicate that freight productivity, when measured by freight tonne-kilometres per pound of spend, is 8% higher than last year, but is 7% lower than in 2014-15. When measured by freight tonne-kilometres per employee, it is 31% lower than 2014-15.

The decline in freight operator productivity mainly reflects a 26% fall in freight tonne-kilometres since 2014-15, initially driven by the closure of the UK coal industry. Growth in construction, intermodal and biomass traffic has helped, but not enough to offset the overall decline.

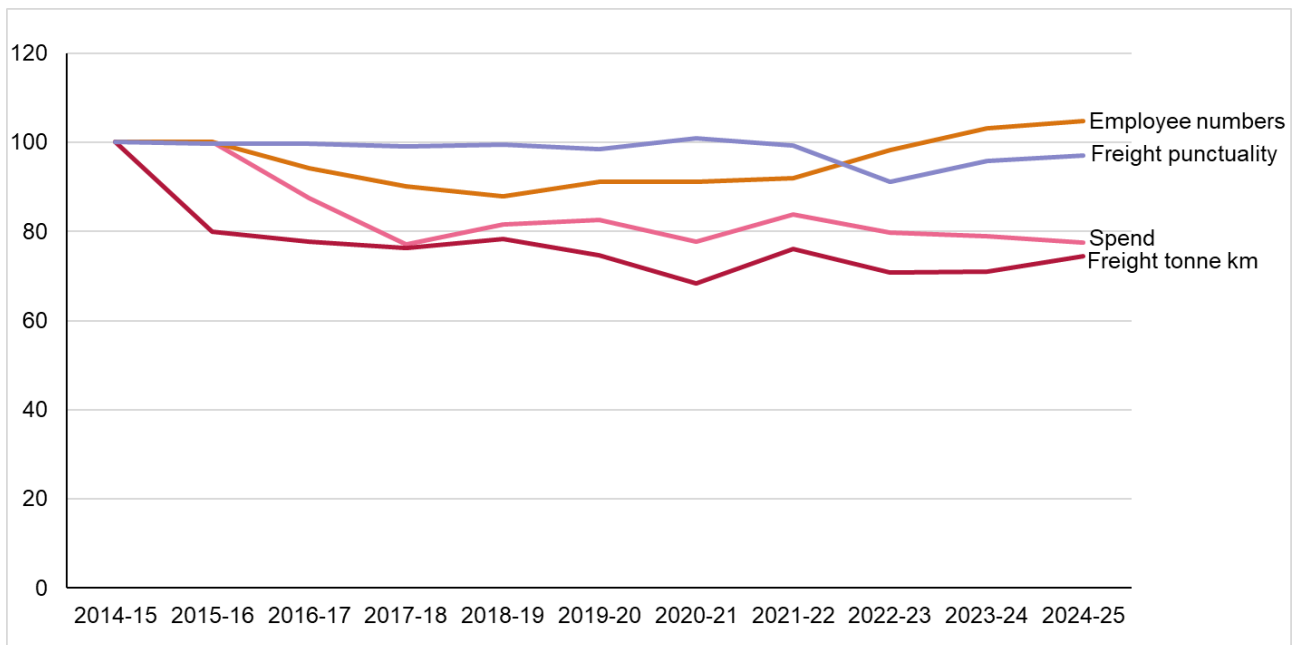
While freight operators have been more effective than passenger operators in reducing costs in line with demand, reductions in freight tonne-kilometres have outpaced cost savings.

Figure 5: Quality adjusted freight operator productivity, indexed to 2014-15



We include both 'freight tonne kilometres per pound of spend' and 'freight tonne kilometres per employee' on this chart as the productivity trend varies depending on whether spend or employees are used as the input. Quality adjustments are made for freight punctuality. This is calculated as 'FDM-R' for freight operators. See Annex C for more information.

Figure 5: Drivers of freight operator productivity, indexed to 2014-15



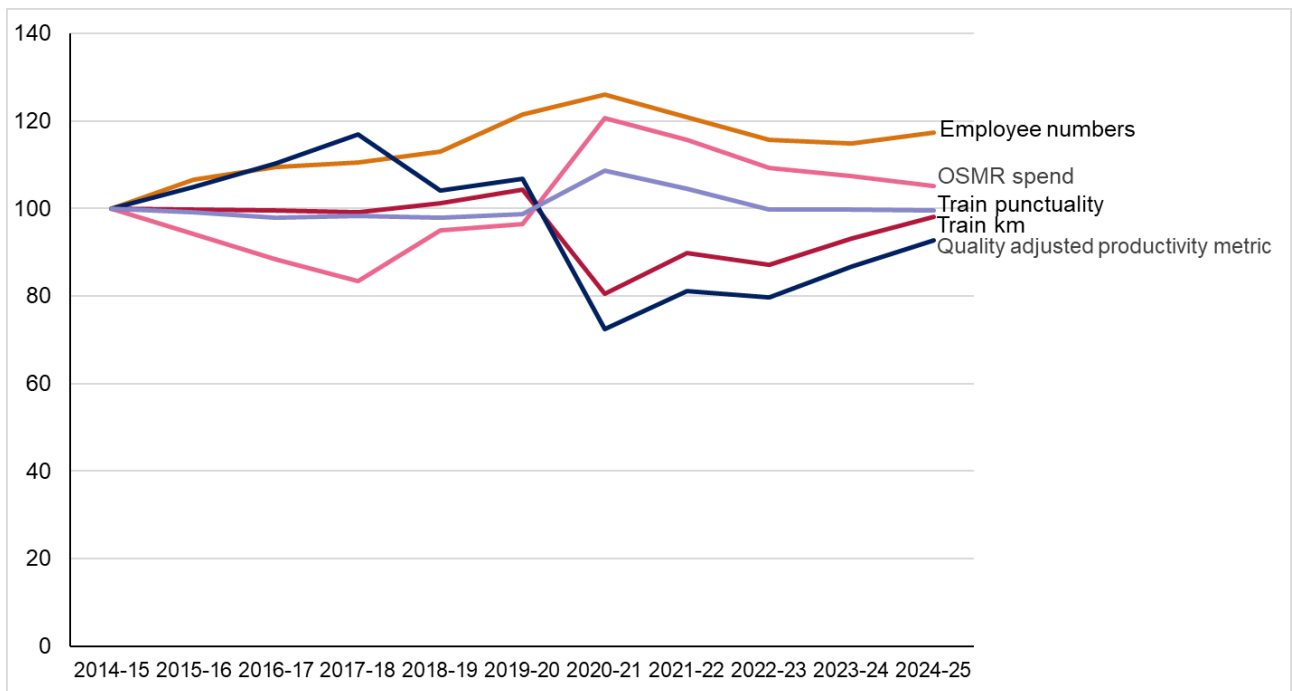
All expenditure values adjusted to 2024–25 prices.

Railway infrastructure productivity has improved since last year but also remains below pre-pandemic levels

Our partial productivity measures indicate that railway infrastructure productivity is improving. Train kilometres per pound of rail infrastructure spend on operation, support maintenance and renewals is 7% higher than last year, but 7% lower than in 2014-15. Train kilometres per Network Rail employee are 17% lower than a decade ago.

Infrastructure spend decreased in recent years but remains 5% higher than in 2014-15.

Figure 4: Drivers of rail infrastructure productivity, indexed to 2014-15



All expenditure values adjusted to 2024–25 prices.

The quality adjusted metric shown in this chart is calculated as train kilometres per pound of operational spend with quality adjustments for punctuality. Punctuality is calculated as ‘time to 3’ minutes for passenger operators and ‘FDM-R’ for freight operators.

Network Rail’s headcount is now 17% higher than in 2014-15, including significant growth in senior management. This has increased costs, although overall staffing has fallen by 7% from its peak in 2020-21.

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Operations, support and maintenance costs have risen steadily over the last decade. Pandemic impacts, industrial action, global supply issues and inflation continue to offset the efficiencies we have set for Network Rail in the Periodic Review. Higher utility costs and more intensive climate-adaptation — such as earthworks, drainage and vegetation management — have also increased costs without necessarily increasing train-kilometres.

Renewals costs, however, have fluctuated with shifting priorities and project timings. Following the five-year funding settlement for Control Period 7 (CP7, covering 2024-2029), Network Rail has made a move toward more maintenance and fewer renewals which has reduced renewals investment relative to CP6 and by 8% year-on-year.

However, lower spend on renewals does not automatically mean improved productivity when work volumes fall or asset condition declines. For example, on an effective-volume-per-pound-of-spend basis, productivity has declined across some asset types and we are starting to see asset condition – as measured by the Composite Sustainability Index (CSI) – reducing slightly. In 2024-25 (the first year of CP7), network-wide CSI shows a 0.4% deterioration relative to the end of CP6, reflecting the shift toward life-extending maintenance rather than full renewals.

Total factor productivity analysis complements our partial productivity measures

This year, we include a total factor productivity analysis of the rail industry based on a study undertaken for us by independent consultants. This is a comprehensive approach to productivity analysis, capturing not only individual inputs but also the efficiency with which labour and capital are combined.

Gross output measures the most relevant physical output (e.g. train or passenger km) for the sector and applies a quality-adjustment in line with the partial measures such as punctuality and quality of rolling stock. An alternative is to measure output on the basis of gross value added.

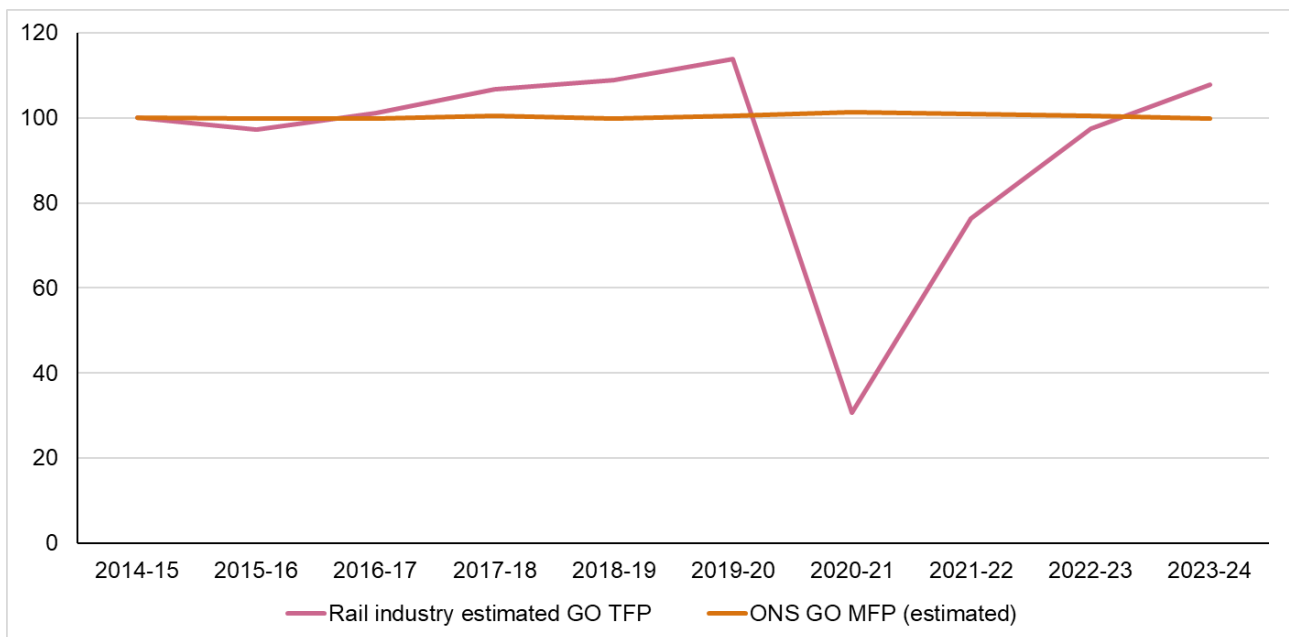
Our preferred measure of total factor productivity uses gross output because as well as consistency with the rest of the report, gross output measures are better for companies which are publicly funded and whose outputs are not typically sold at free market prices such as Network Rail.

Our total factor productivity analysis covers data up to 2023-24. This is one year less than in our partial productivity measures, because 2023-24 is the latest year for which consistent total factor productivity data is available.

On this measure, whole industry productivity declined during the pandemic, and has since significantly recovered, rising by 11% in 2023-24 and is now 8% above the levels of 2014-15.

In the wider economy productivity growth has remained relatively flat since 2014-15¹. As shown below, our analysis suggests that the rail industry has seen higher productivity growth than the wider economy in recent years, although there was more volatility over the decade. This is because the rail industry is more susceptible to rapid changes in passenger demand and has high levels of fixed costs that do not fall when demand is reduced (as happened during the pandemic).

Figure 6: Comparison of rail industry gross output total factor productivity indices with ONS multi-factor productivity for the whole UK economy, indexed to 2014-15



Total Factor Productivity (TFP) is a measure of economic performance which examines the overall efficiency with which labour and capital inputs are used together in the production process. TFP is the part of economic growth that cannot be explained by changes in labour and capital inputs. ONS produce a comparable multi-factor productivity time series. TFP and multi-factor productivity are often used interchangeably.

¹ [Annual multi-factor productivity, market sector, UK - Office for National Statistics](#)

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Whole-industry productivity appears stronger using total factor productivity than under the partial measure of productivity because each approach uses slightly different inputs and outputs. The main difference is in how inputs are measured.

Total factor productivity examines the value of the rail network as an input. The asset value of the rail network has fallen in real terms because depreciation has exceeded new investment in renewals and enhancements. This has increased capital productivity offsetting the reduction in labour productivity. Care will need to be taken to ensure that this increased productivity does not come at the expense of asset health and sustainability. By contrast, our partial productivity measures use in-year expenditure as the input. Operational expenditure has risen faster than rail outputs over the decade (train-kilometres are actually slightly below 2014-15 levels), leading to a decline in our partial productivity metrics.

Total factor productivity uses weighted passenger-kilometres and freight-tonne-kilometres as the output, which have grown slightly, increasing measured productivity. In contrast, our partial productivity measure uses train-kilometres which, as noted above, remain slightly below 2014-15 levels (down 2% versus 2014-15).

Both total factor productivity analysis and our partial productivity measures show that productivity has been recovering since the pandemic, with passengers returning to the railway, although productivity has not yet returned to the peak levels seen before the pandemic. They highlight that the industry remains highly sensitive to shifts in passenger and freight demand, as well as rising costs.

Rail reform is expected to drive further improvements

In November 2025, the Department for Transport (DfT) set out its plans for the railway, which will result in the creation of Great British Railways (GBR). The plans highlight some of the issues which if resolved could improve productivity, for example the current fragmentation of the rail industry and the lack of long-term strategic thinking. GBR will integrate track and train, aiming to deliver cost savings and economies of scale, and provide unified leadership operating to an integrated business plan.

As more years of productivity data are included in future editions of this report, we will be able to track longer-term trends, not only from pre-to post-pandemic developments, but also the transition to GBR.

1. Introduction

This is our third annual report on rail industry productivity, following on from our [last report published in March 2025](#), and our [discussion paper in 2024](#).

Productivity is the ratio between the amount of goods and services produced (outputs) and the resources used (inputs). Productivity increases when more (or higher quality) output is delivered with the same or fewer resources.

This year we have taken two approaches to measuring productivity in the railway which complement each other.

- Chapters 2 to 5 follow a ‘partial productivity measures’ approach, which compares one output with a single input. For example, ‘passenger kilometres per employee’, or ‘freight tonne kilometres per pound of spend’. This enables us to drill down into individual drivers of industry productivity, one at a time.
- This year we have included a new approach to measuring rail sector productivity, ‘total factor productivity’ (chapter 6) based on a report we commissioned from Europe Economics. Europe Economics’ full report is available [here](#). Total factor productivity is a comprehensive and robust approach to assessing productivity as it accounts for all inputs at the same time, reflecting both the productivity of people and capital, whilst allowing comparisons to productivity in the wider economy.

This year we have also added additional quality adjustments to our key passenger metrics to reflect the benefits of investment in rolling stock.

The structure of our report is as follows:

- Chapter 2 focuses on rail industry productivity as a whole, covering both train operators and infrastructure managers of the rail network.
- Chapter 3 focuses on passenger train operators.
- Chapter 4 focuses on freight operators.
- Chapter 5 focuses on infrastructure managers of the UK rail network.
- Chapter 6 introduces total factor productivity and Gross Value Added and compares the rail industry to the wider economy.

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- Annex A provides a summary of our 'partial productivity' metrics, Annex B compares the metrics by passenger operator, Annex C outlines the methodology used.

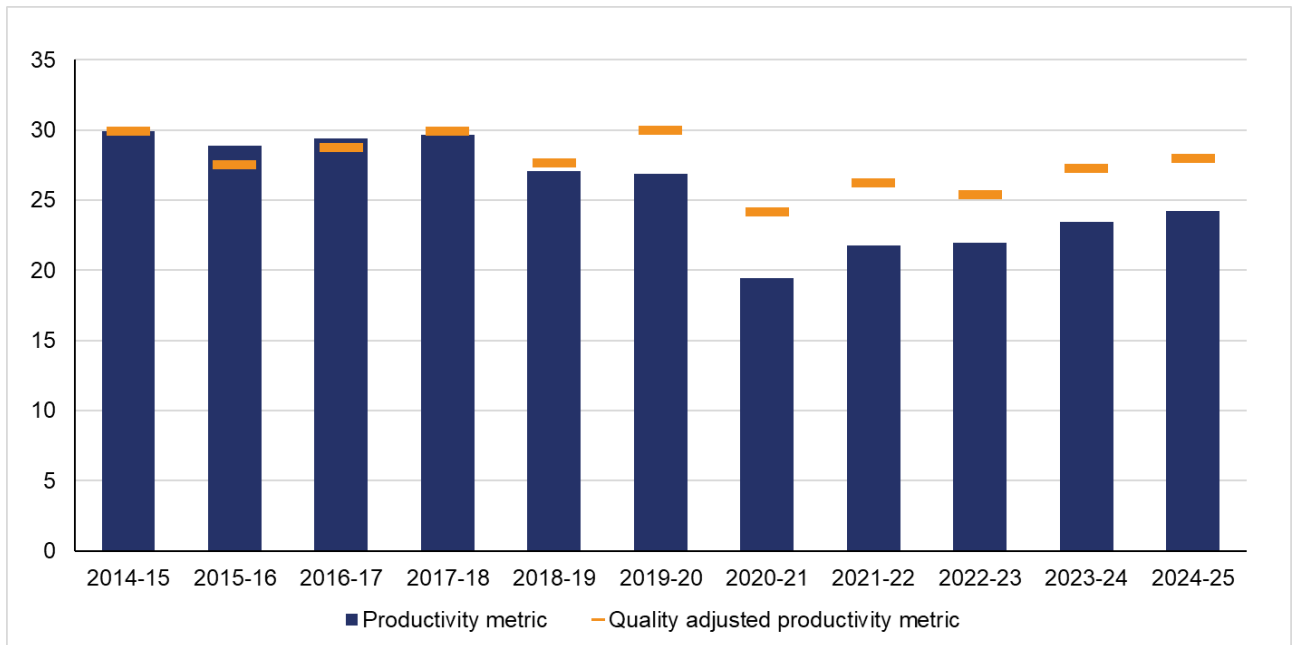
The data which underpins this report has largely been sourced from publicly available information such as our [data portal](#).

All expenditure has been stated in 2024-25 prices throughout this report.

2. Industry wide productivity

- 2.1 This chapter reports on productivity of the rail industry as a whole over time based upon our partial productivity measures. It explores the productivity of infrastructure managers such as Network Rail, passenger operators and freight operators.
- 2.2 Expenditure on the supply chain is included, but commentary on the productivity of the supply chain itself is outside the scope of this report.
- 2.3 The rail industry's productivity – as measured by train kilometres per pound of spend and adjusted for changes in train punctuality and rolling stock age - has improved by 3% since last year. Train distance travelled increased by 5% while total industry costs remained relatively stable.
- 2.4 Despite recent improvements, as shown by Figure 2.1, productivity remains 19% lower than in 2014-15 and 6% lower when quality adjustments for train punctuality and rolling stock age are included. Total train kilometres of 566 million are 2% lower than a decade ago, largely back to pre-pandemic levels, whereas costs remain 21% higher.
- 2.5 We have adjusted industry output, as measured by train kilometres, to reflect an increase in quality over time. Quality adjustments have been made for both rolling stock age and performance. Rolling stock age has decreased by 17% over the period as the industry has invested in new trains. Train punctuality has fluctuated over the period, with worsening performance prior to the pandemic and better performance over the pandemic years. Over the decade punctuality is largely unchanged.
- 2.6 The railway has a high proportion of fixed costs that do not fall when services are reduced, as seen during the pandemic. For example, signalling costs are broadly the same whether 1 or 100 trains run.
- 2.7 Cost trends also differ across the industry: Infrastructure operating costs are gradually declining but remain 5% above 2014-15 levels (in real terms), while passenger operator costs have risen by 40% over the same period, driven largely by investment in new rolling stock.

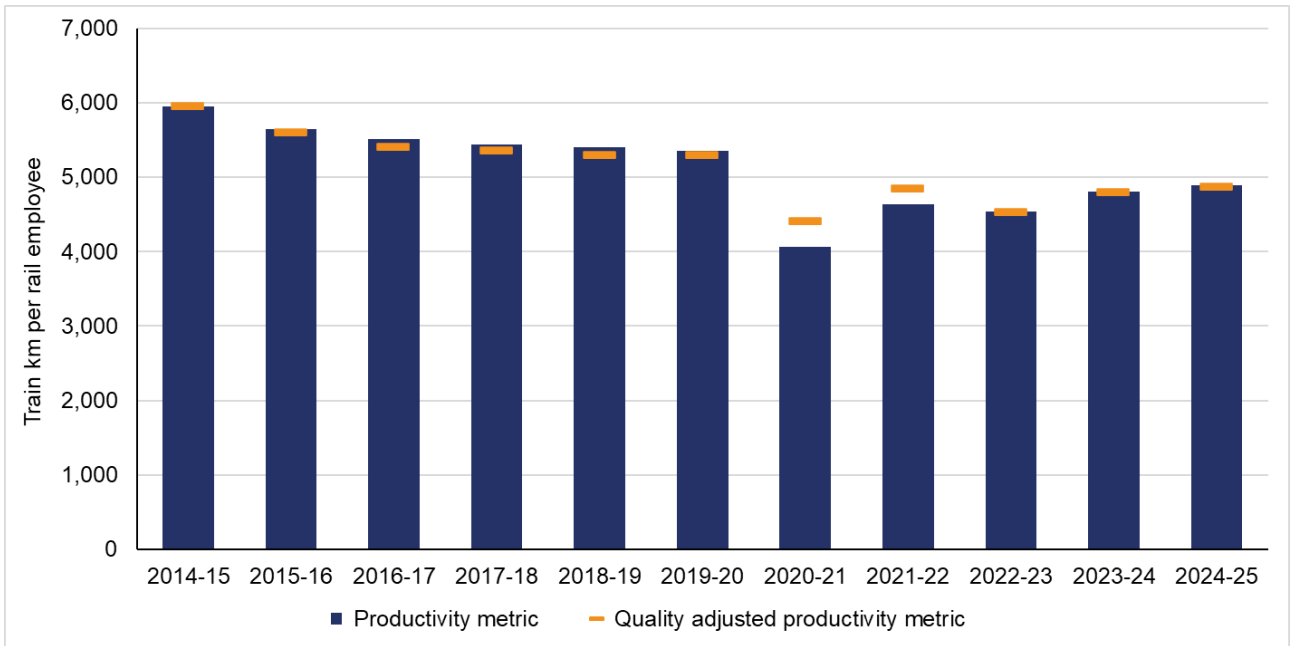
Figure 2.1 Total passenger and freight train kilometres per thousand pounds of industry expenditure



All expenditure values have been adjusted to 2024–25 prices.

- 2.8 Labour is also a significant component of industry expenditure, and therefore an important contributor to rail industry productivity. Over 100,000 people work for Network Rail and train operators combined, at a total cost to the rail industry of £7.5 billion (29% of total industry expenditure).
- 2.9 Labour productivity, on a train kilometre per rail industry employee basis, has improved by 1% since last year. However, it remains 18% lower than in 2014-15. This is because while train kilometres have largely recovered and are close to 2014-15 levels, rail industry workforce has increased by 19% (or 18,780 people). This increase in the workforce will, in part, be explained by new operators to the market (such as Lumo and the Elizabeth Line).
- 2.10 Increased headcount may also reflect stricter safety policies on shift lengths and rest periods, which will influence the number of employees required. This, combined with increased spend on safety initiatives (such as on track worker safety), has led to the reduction of fatalities on the network by 27% since 2014-15. As the combined safety and economic regulator for Britain’s railway, we carefully consider the costs and associated benefits of health and safety interventions in rail. See our latest reporting on these matters [here](#).

Figure 2.2 Labour productivity in rail



2.11 Table 2.1 sets out how each sector has contributed to the overall industry-wide ten-year productivity trend. It shows the percentage change since 2014-15 for inputs, outputs, and quality adjustments.

2.12 Each of the partial productivity sector-level trends are explored in more detail in Chapters 3, 4 and 5.

Table 2.1 Percentage change in key productivity drivers from 2014-15 to 2024-25

Sector	Inputs	Outputs		Quality adjustments		Quality adjusted productivity metric	
10 year trend	Expenditure*	Employee numbers	Train kilometres	Punctuality**	Rolling stock age	Kilometres per pound of spend	Kilometres per employee
Passenger operators	+40%	+23%	0%	0%	-17%	-14%	-16%
Freight operators	-23%	+5%	-22%	-3%	n/a	-7%	-31%
Infrastructure managers	+5%***	+17%	-2%	0%	n/a	-7%***	-17%
Whole industry	+21%****	+19%	-2%	0%	-17%	-6%****	-18%

*All expenditure values have been adjusted to 2024–25 prices. The individual sector results will not add to the whole industry due to the differences in outputs and quality adjustments used.

**Punctuality is calculated as ‘time to 3’ minutes for passenger operators and ‘FDM-R’ for freight operators.

***For our headline partial productivity measures, we have focused on infrastructure operational (OSMR) spend only. If enhancement spend is included, infrastructure expenditure has decreased by 5% and its quality adjusted train kilometres per pound of spend has improved by 3% since 2014–15.

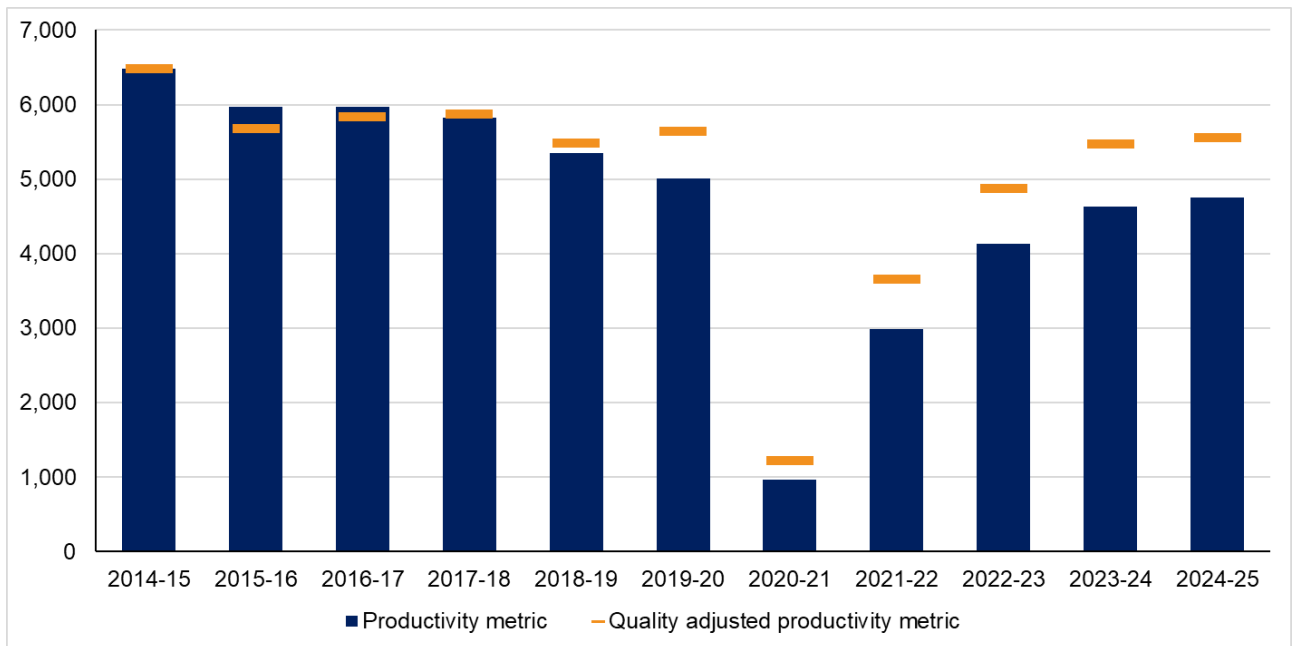
****If infrastructure enhancement spend is included, whole industry expenditure has increased by only 11% and its quality adjusted train kilometres per pound of spend has improved by 2% since 2014–15.

3. Passenger operator metrics

Passenger operator productivity trends

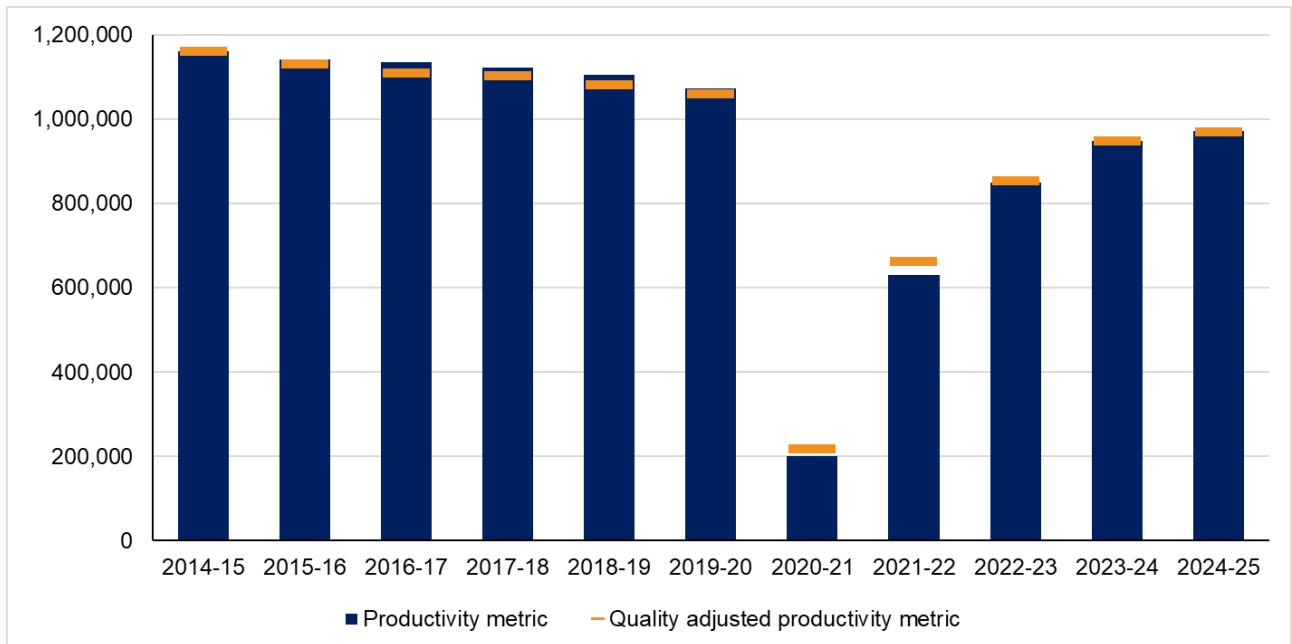
- 3.1 This chapter looks at our partial productivity measures for passenger operators.
- 3.2 Passenger operator productivity – as measured by passenger kilometres per thousand pounds of spend – has partially recovered since the pandemic. However, it remains 27% lower than in 2014-15, as shown in Figure 3.1.
- 3.3 With quality adjustments for rolling stock age and punctuality, productivity has fallen by 14% since 2014-15, better than the unadjusted metric.

Figure 3.1 Passenger kilometres per thousand pounds of spend



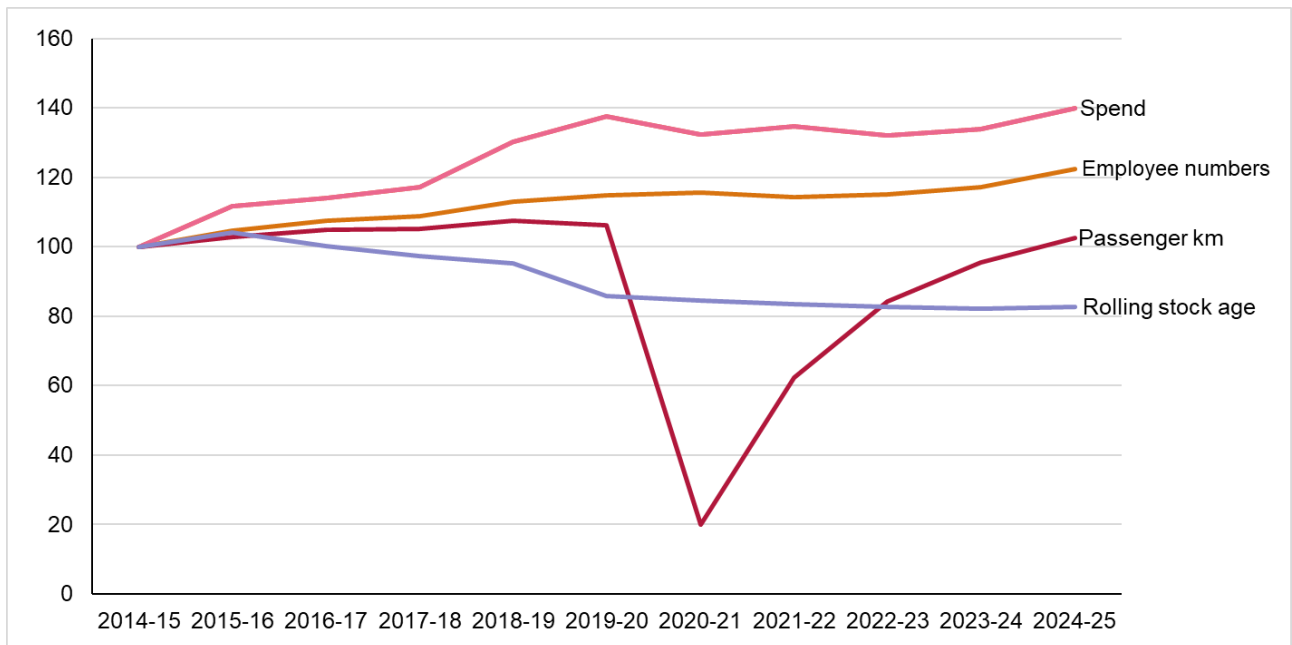
- 3.4 Passenger operator labour productivity – as measured by passenger kilometres per train operator employee and adjusted for changes in train punctuality – has increased by 2% since 2023-24. However, it remains 16% lower than in 2014-15, as shown in Figure 3.2.

Figure 3.2 Passenger kilometres per operator employee



3.5 Figure 3.3 illustrates the underlying inputs, outputs, and quality adjustments underpinning the passenger operator productivity metrics shown above and highlights the factors that have driven productivity changes over the last decade.

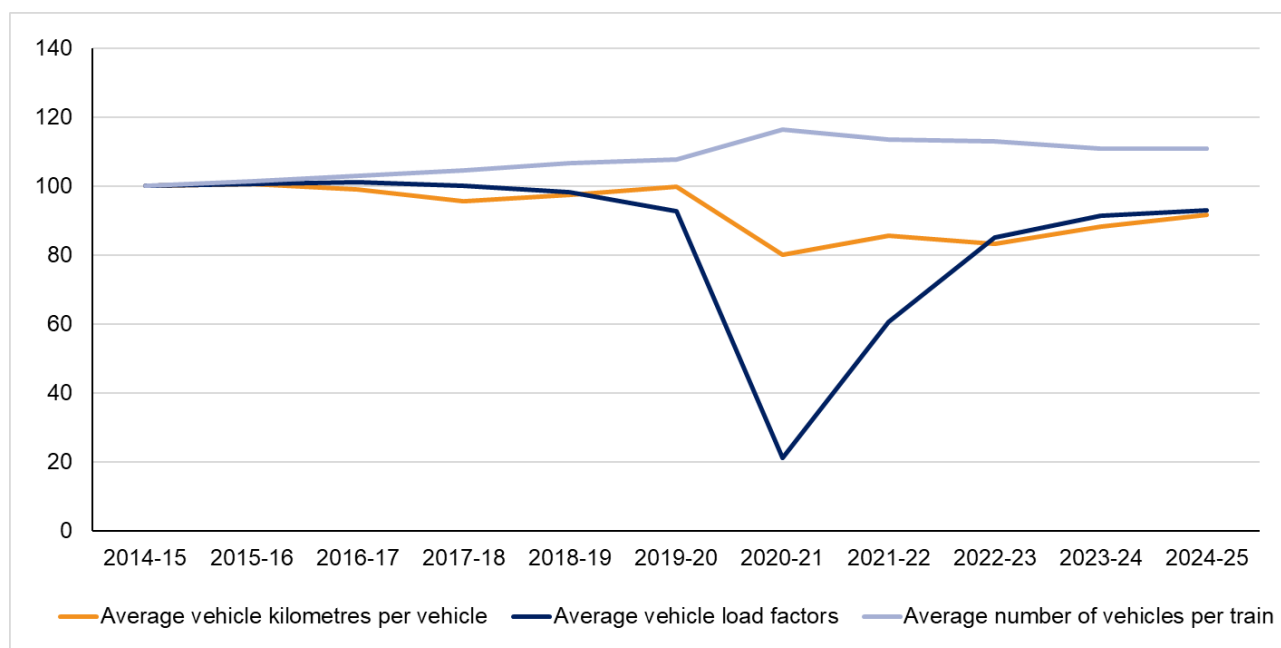
Figure 3.3 Drivers of passenger operator productivity, indexed to 2014-15



The inputs

- 3.6 Passenger train operator expenditure has increased by 40% since 2014-15, making this the largest contributor to the decline in productivity over the period. The most significant cost increases relate to rolling stock and then staff.
- 3.7 There are over 15,000 passenger rolling stock vehicles on the UK rail network. Last year, rolling stock leases and maintenance cost the industry £4.1 billion. This is 31% of passenger operator expenditure. The industry, in partnership with government, has recently made a series of investments in new rolling stock. This has reduced average fleet age by 17% and expanded the fleet size by 20% since 2014-15, increasing costs.
- 3.8 The introduction of newer models is driven by the life expiry of existing fleets, and efforts to improve safety, customer experience, performance and decarbonise the industry. This can make new vehicles more expensive.
- 3.9 Rolling stock decisions are made years in advance and can help deliver value for money; but can leave operators locked into long-term leases that cannot be quickly adjusted when demand shifts, as seen during the pandemic.
- 3.10 Global market pressures have driven up material and manufacturing costs for new rolling stock, which must be specialised to meet UK rail specifications.
- 3.11 At the same time, rolling stock utilisation has declined, as shown in figure 3.4. The average distance travelled per vehicle has decreased by 8% since 2014-15 and the average number of passengers per vehicle has decreased by 7% to around 20 passengers per vehicle.
- 3.12 The average number of vehicles per train has increased by 11% since 2014-15. This may have benefits in terms of optimising the use of staff and reducing overcrowding. However, overall, train operators are now paying more for vehicles than they were in 2014-15, at the same time as carrying fewer passengers per vehicle.

Figure 3.4 Rolling stock utilisation and load, indexed to 2014-15



- 3.13 Staff costs account for 33% of train operator expenditure. Staff costs have risen by 26% since 2014-15.
- 3.14 Staff numbers increased by 23%, from around 54,000 to 66,000, with most growth occurring prior to the pandemic.
- 3.15 Average employee costs increased by 3% in real terms, rising from £65,671 in 2014-15 to £67,570 in 2024-25 prices.
- 3.16 Pay growth above general inflation can affect productivity measures by increasing costs if there are no corresponding output gains. However, the increase in headcount has had a much larger impact on productivity than changes in average pay.
- 3.17 Growth in staff numbers reflect a 6% growth in passenger demand in the six years running up to the pandemic, additional operators and services, such as Lumo and the Elizabeth line and a shift towards bringing more rolling stock maintenance in-house².

² Note that our expenditure-based productivity metrics capture the costs of both outsourced services and in-house operations. This means our 'Passenger kilometres per pound of spend' measure is comparatively less sensitive to shifts in the extent of in-housing than our 'Passenger kilometres per employee' measure.

The output: passenger kilometres

- 3.18 Passenger kilometres have grown by 3% since 2014-15, despite a sharp decline during the pandemic. While recovery has been steady, travel patterns have been constrained by industrial action and a post-pandemic shift toward remote working and reduced business travel. As a result, passenger kilometres are still around 5% below their pre-pandemic peak in 2019.
- 3.19 We use passenger kilometres as the primary output for train operator productivity because it captures both passenger volumes and distances travelled—the two key dimensions of operator output. Additional metrics are provided in Annex A to explore alternative outputs.

The quality adjustments

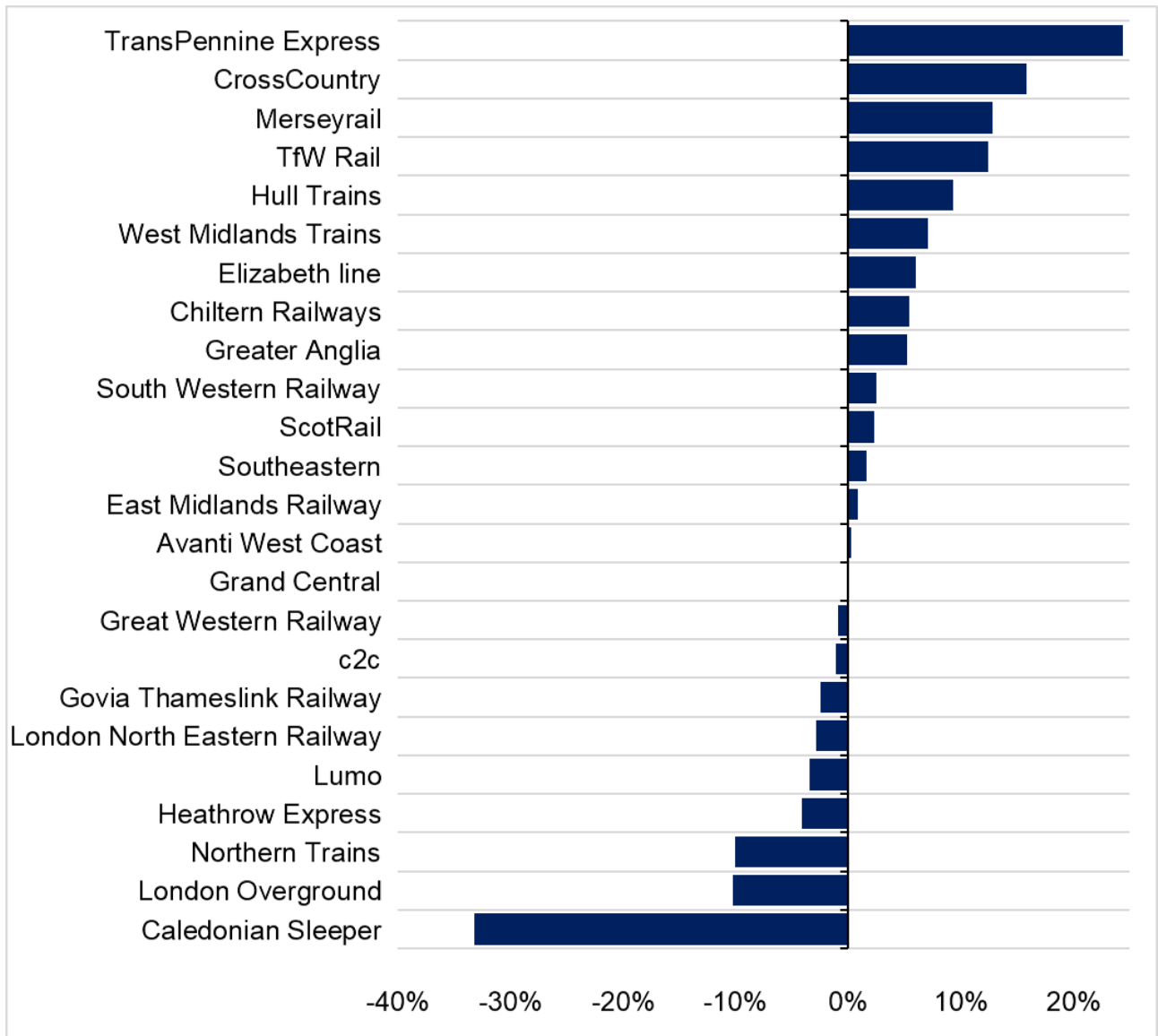
- 3.20 Rolling stock age is a key indicator of rolling stock quality, passenger comfort, passenger experience, safety and environmental sustainability. Including a quality adjustment based on rolling stock age helps ensure that productivity metrics recognise quality-enhancing, long term investments. The average rolling stock age has improved by 17% since 2014-15, from 20.2 years to 16.7 years. This quality adjustment has been applied to our ‘output per pound’ metric and not our ‘output per employee’ metric as it reflects changes in capital, not people. The rolling stock adjustment has boosted recent productivity scores and partially offsets some of the negative impacts of higher expenditure on our productivity measures.
- 3.21 The quality adjustment for train punctuality has been applied to both our ‘output per pound of spend’ and ‘output per employee’ metrics. It has been measured by on-time performance (within 3 minutes) and is broadly unchanged from 2014-15. While punctuality improved during the pandemic due to fewer trains and passengers and disruptions, performance has since returned to pre-pandemic levels. This adjustment therefore has a limited impact on the current productivity score.
- 3.22 See our methodology chapter for more detail on the quality adjustments applied.

Passenger operators’ comparative productivity

- 3.23 Productivity varies significantly between passenger train operators.
- 3.24 Figure 3.5 shows which operators have seen the most growth in productivity since last year. The chart compares each operator to themselves a year ago.

3.25 For operators showing a productivity decline this year, the main driver was an increase in expenditure.

Figure 3.5 Growth in passenger kilometres per pound of spend (with quality adjustments), by operator, April 2024 to March 2025



3.26 Figure 3.6 below shows the relative productivity of each of the 24 operators in the latest year. The chart compares operators to one another.

3.27 The relative productivity of individual operators can look different depending on whether we use passenger kilometres or passenger journeys as the basis of our productivity measure. For example, the productivity of long distance operators is

higher when passenger kilometres are selected as the output, due to longer average passenger journey length, while London based operators show higher productivity when the number of passenger journeys are selected as the output, which reflects the nature of the market they serve.

3.28 Figure 3.6 is a scatter graph which plots operators using both measures and includes quality adjustments for rolling stock age and punctuality.

3.29 Operators towards the top right of the chart perform better using both passenger journeys and passenger kilometres and for quality adjustments.

3.30 We note that [open access operators](#) do not pay the same level of fixed charges as franchised passenger operators. We have excluded fixed track access charges from our analysis to enable a more like-for-like comparison.

Figure 3.6 Passenger journeys and kilometres per thousand pounds of passenger operator expenditure, by operator, in 2024-25



3.31 Lumo, Hull Trains and Grand Central operators (all long distance open access operators) carried passengers the furthest distance for each pound spent.

3.32 The London Overground and Elizabeth Line operators carried the largest number of passengers for each pound spent.

- 3.33 Greater Anglia and Merseyrail received strong quality adjustments, calculated by comparing each operator's rolling stock age and punctuality (within three minutes) to the industry average.
- 3.34 Greater Anglia, Govia Thameslink Railway (GTR) and c2c perform well when passenger kilometres, journeys and quality adjustments are considered.
- 3.35 There are good reasons why some train operators are more or less productive than others using these metrics, some within a company's control, some not. These include:
- Service level requirements set by funders can increase costs for franchised operators. Funders define the services their contracted operators must deliver, including rolling stock requirements, minimum service levels, capacity, number of stops, stopping patterns and journey times. This particularly impacts regional operators where population density may be lower, yet connectivity remains important. [Open access operators](#) are not bound by the same service level requirements.
 - Recovery following the pandemic has varied between operators. For example, commuter routes have recovered less quickly than leisure routes. See our [passenger rail usage statistics](#) for more detail.
 - The Caledonian Sleeper offers cabins, sleeper seats and a premium service. Consequently, its rolling stock carries fewer passengers and may have higher costs, reducing its score in figure 3.6.
 - Some operators have invested heavily in their rolling stock since 2014-15. Examples include the Great Western Railway (GWR), East Coast (LNER).

Conclusions

- Passenger train operator productivity has improved in recent years but remains below 2014-15 levels.
 - Passenger kilometres per pound of spend are 27% lower than in 2014–15 (14% lower with quality adjustments)
 - Passenger kilometres per employee remain 16% lower.
- The decline in productivity reflects a combination of higher input costs (40% higher) and only modest growth in passenger kilometres.

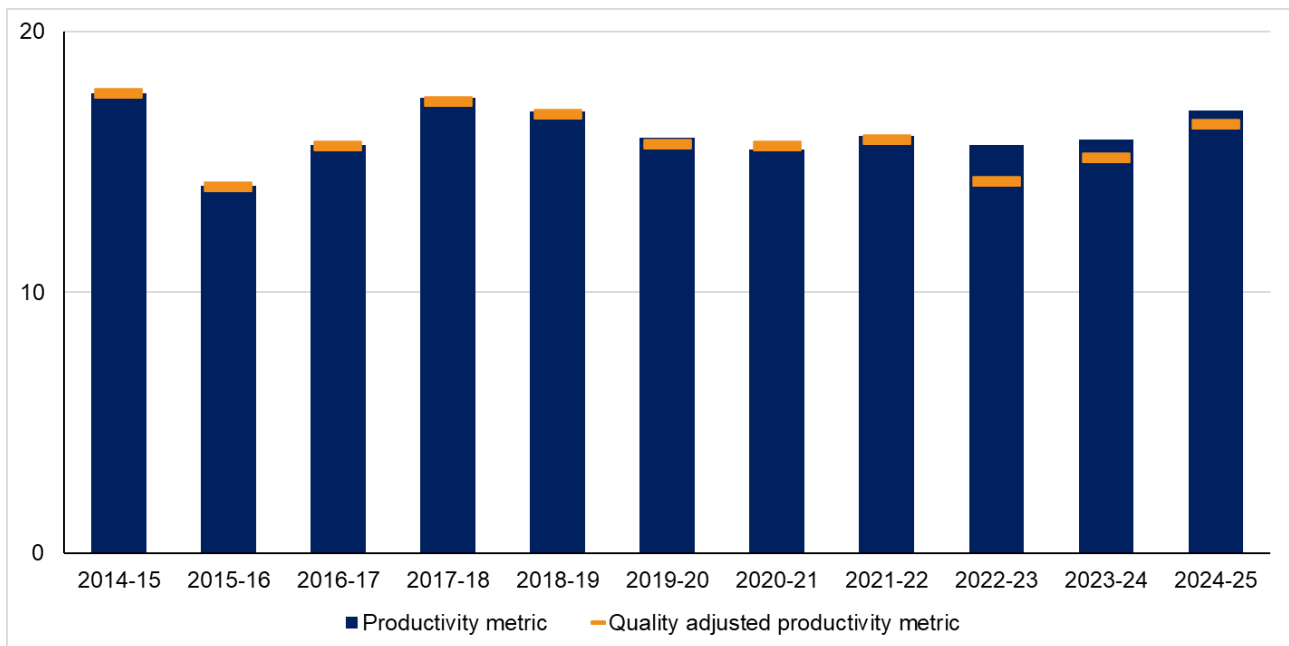
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- Newer, more expensive fleets are used less intensively and carrying fewer passengers per vehicle than a decade ago.
- Staff numbers have also increased substantially, partly reflecting additional services and enhanced safety requirements.
- Quality adjustments for rolling stock age have improved productivity scores, particularly for Merseyrail and Greater Anglia.
- Productivity varies significantly across operators, reflecting differences in markets served, service requirements and recovery from the pandemic.
- The new Elizabeth Line and Lumo operators have helped drive productivity recovery following the pandemic.

4. Freight operator metrics

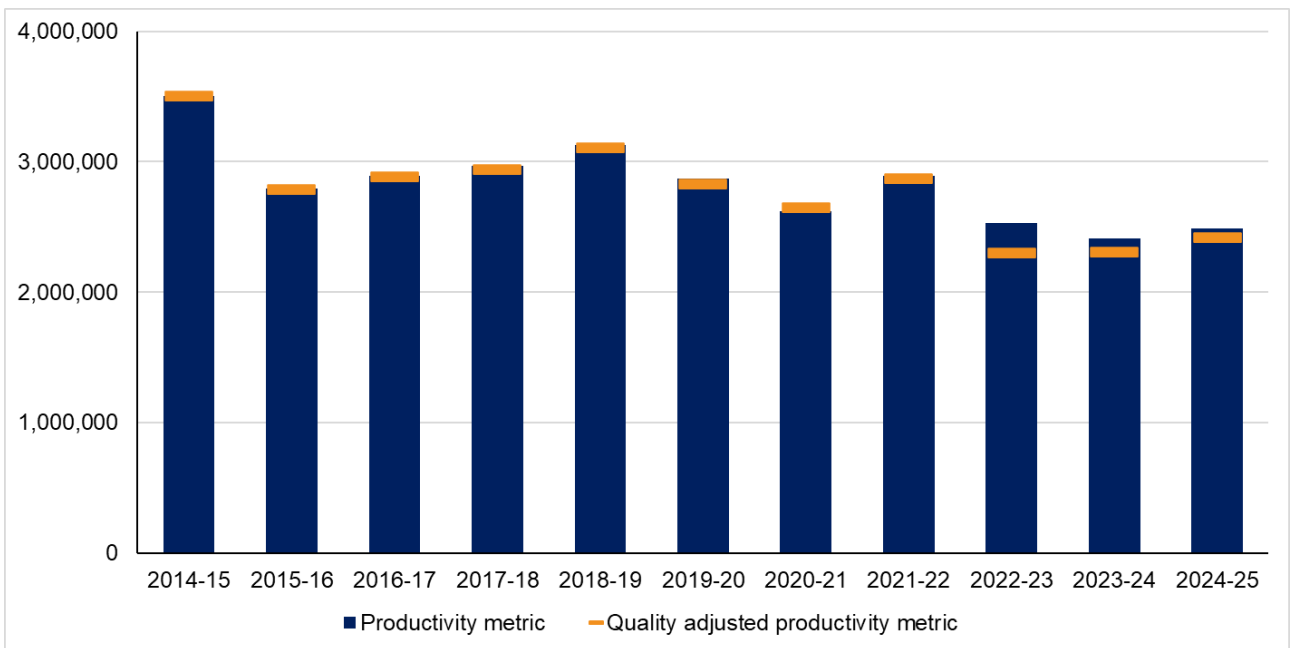
- 4.1 Freight operator productivity — measured as freight tonne kilometres per pound of spend and adjusted for changes in train punctuality — increased by 8% in 2024-25, but remains 7% below 2014-15 levels (as seen in Figure 4.1).
- 4.2 The decline versus 2014-15 is primarily driven by a 26% reduction in freight tonne kilometres, while freight operator expenditure has fallen by a slightly smaller 23%.
- 4.3 Freight operators have adjusted much of their spending with the decline in demand, meaning output per pound spent has fallen less sharply than that of passenger operators. Franchised passenger operators have less flexibility to adjust their cost base than freight operators because they must adhere to long-term service level agreements set by funders. Nevertheless, freight operators still have some fixed costs that do not decline in direct proportion to output.

Figure 4.1 Freight tonne kilometres per pound of spend



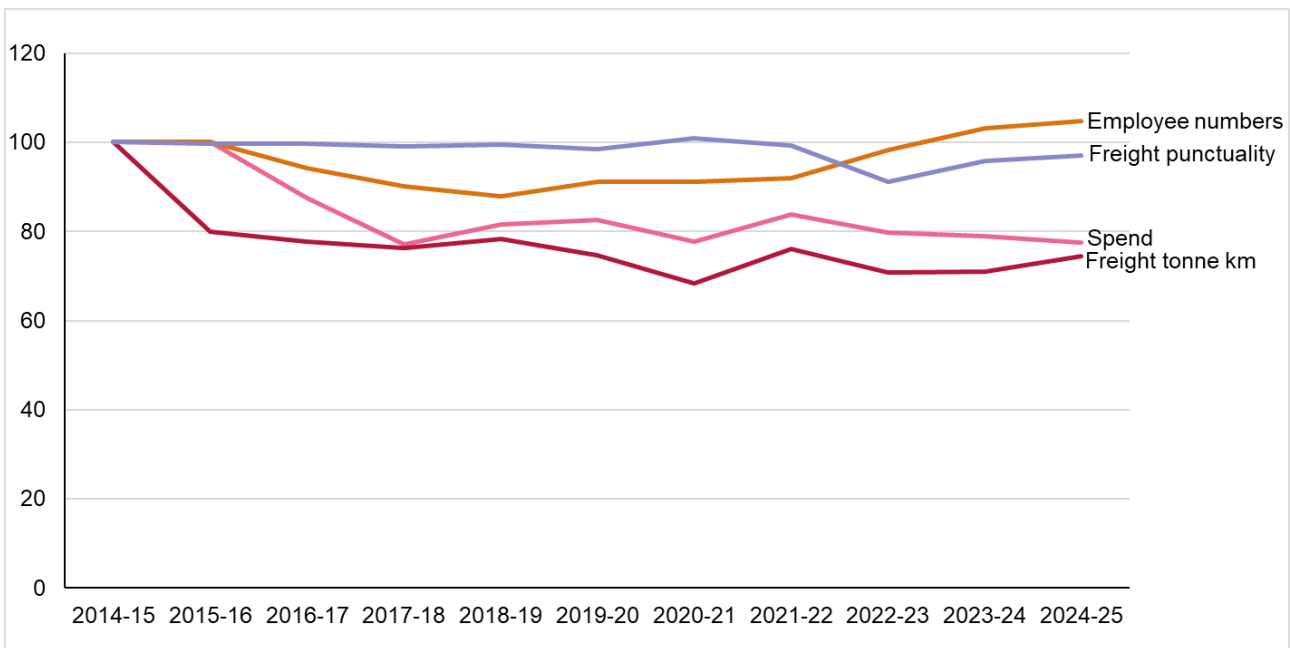
- 4.4 Freight operator labour productivity — measured by freight tonne kilometres per employee and adjusted for changes in train punctuality — has increased by 5% since 2023-24, but remains 31% below 2014–15 levels, as shown in Figure 4.2.

Figure 4.2 Freight tonne kilometres per employee



4.5 Figure 4.3 illustrates the key inputs, outputs and quality adjustments underlying these measures.

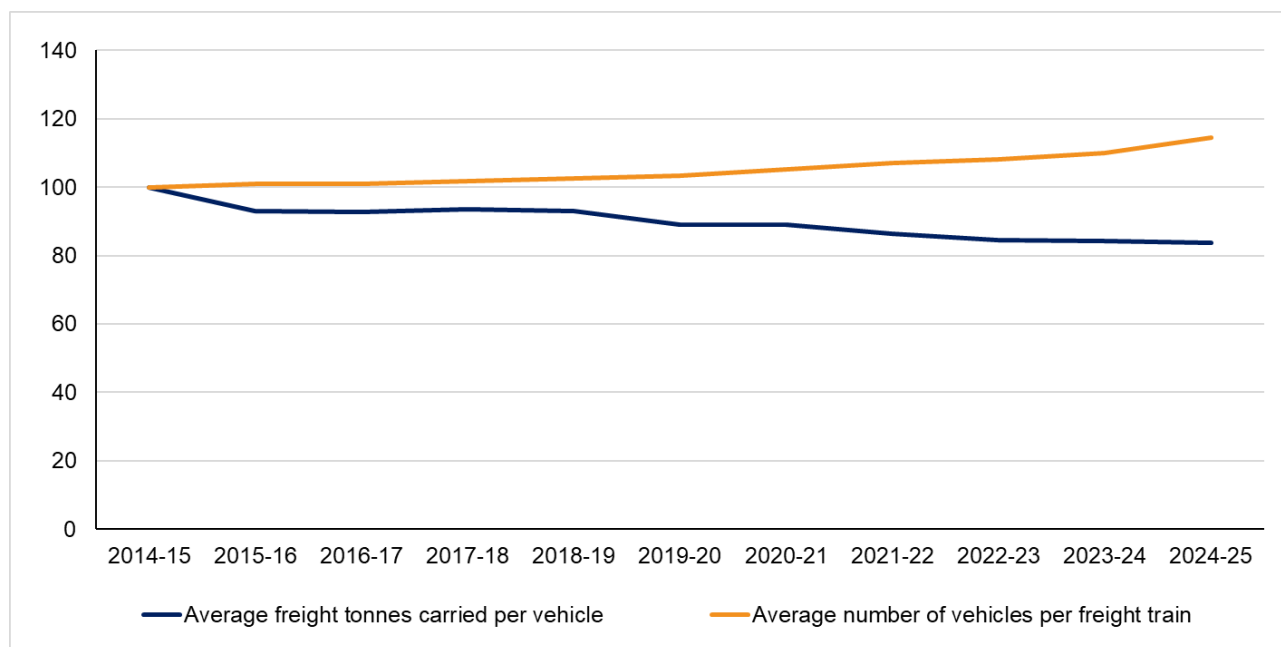
Figure 4.3 Key drivers of freight operator labour productivity, indexed to 2014-15



The inputs

- 4.6 Freight operator employees have increased by 5% since 2014-15, reducing our productivity measure.
- 4.7 As shown in Figure 4.4, the average number of vehicles (including locomotives and carriages) per freight train has increased from 20 to 23, showing efforts to optimise the use of resources.
- 4.8 However, the average load - as measured by tonnes carried per vehicle - has decreased by 16% since 2014-15.

Figure 4.4 Freight operator rolling stock utilisation and load, indexed to 2014-15



The output

- 4.9 The most significant contributor to the decline in freight operator productivity has been the 35% reduction in freight tonnes carried and the associated 26% reduction in freight tonne kilometres and 22% reduction in freight train kilometres since 2014-15. Several structural factors have contributed to this trend.
 - The freight industry has been heavily affected by the decline in coal traffic following the closure of coal mines.

- Growth in construction, intermodal, and biomass traffic has helped offset some of this loss. Nevertheless, growth in these markets has been constrained by a variety of factors. For example, freight is most competitive when there is large point to point flows – particularly over medium- to long-distances.
- The origins, destinations and routes of the new mix of commodities are not the same. Track near former coal mines is not as useful for other freight. Other freight (particularly for construction) often travels to locations where it must compete more with passenger operators for use of the network.
- Rail freight can also find it difficult to compete with road freight due to road freight's relative advantage on cost and, for some markets, convenience. For example, lorries can deliver door-to-door, using one supplier and one quote.
- There are also often loading gauge issues, with inconsistent bridge, tunnel and platform heights which limit the types of goods that can be transported and the rail routes that can be taken, hampering growth of new commodities.
- Freight demand to some extent reflects the health of the wider economy and will fluctuate in line with broader economic trends, including the UK moving to a more service-based economy.

Table 4.1 Change in freight tonne kilometres, by commodity, 2014-15 to 2024-25

Commodity	Change in freight tonne kilometre
Coal	▼ Decline of 99%
Metal	▼ Decline of 41%
Biomass	▲ Increase of 51%
Construction	▲ Increase of 43%
Intermodal	▲ Increase of 12%

4.10 We use freight tonne-kilometres as the output for our headline freight productivity measures because it captures both the weight of freight carried and the distance travelled, which together represent core freight operator outputs.

4.11 However, tonne-kilometre measures do not fully capture differences in the economic value of freight. For example, a fully loaded intermodal train may generate similar revenue to a coal train despite carrying less tonnage due to differences in commodity density.

The quality adjustment:

4.12 We apply a quality adjustment to freight based on train punctuality, measured using on-time performance within 15 minutes. Since 2014–15, this measure has fallen by 3%, slightly reducing the quality adjusted productivity scores in recent years.

Conclusions

- Freight tonne-kilometres per pound of spend are 7% lower than in 2014-15, but improved by 8% last year.
- The fall in productivity over the longer term is largely driven by the decline of the UK coal industry, however the growth in other markets, such as intermodal has helped offset this decline.
- While freight operators have been more effective than passenger operators in reducing costs in line with demand, output has still fallen faster than expenditure.

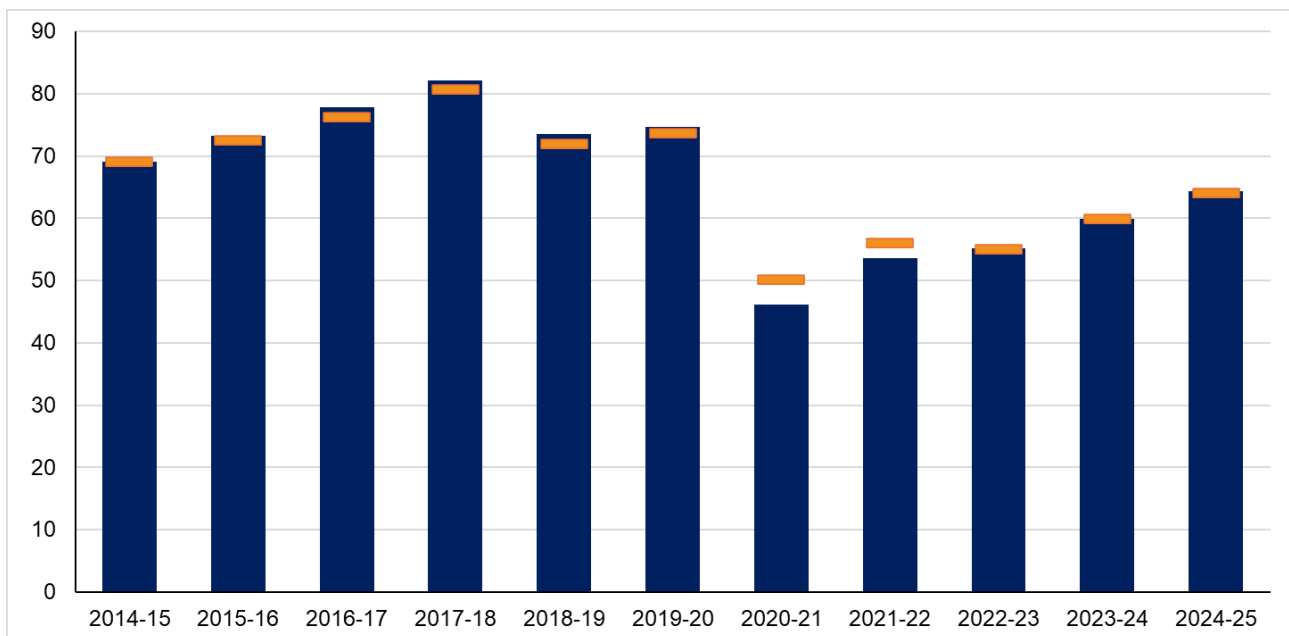
- In addition, modest increases in headcount have continued to place downward pressure on productivity.

5. Infrastructure manager metrics

Infrastructure manager productivity trends

- 5.1 Partial productivity measures of the rail infrastructure show improvements in recent years. The focus of this chapter is on Network Rail, however we also include High Speed 1 and the Core Valley Lines in our analysis where data is available.
- 5.2 The productivity of the rail infrastructure - measured by train kilometres per thousand pounds of operational spend (including operations, support, maintenance and renewals (OSMR) spend) and adjusted for changes in train punctuality has increased by 7% since 2023-24, but remains 7% below 2014-15, as shown in figure 5.1.

Figure 5.1 Train kilometres per thousand pounds of OSMR spend



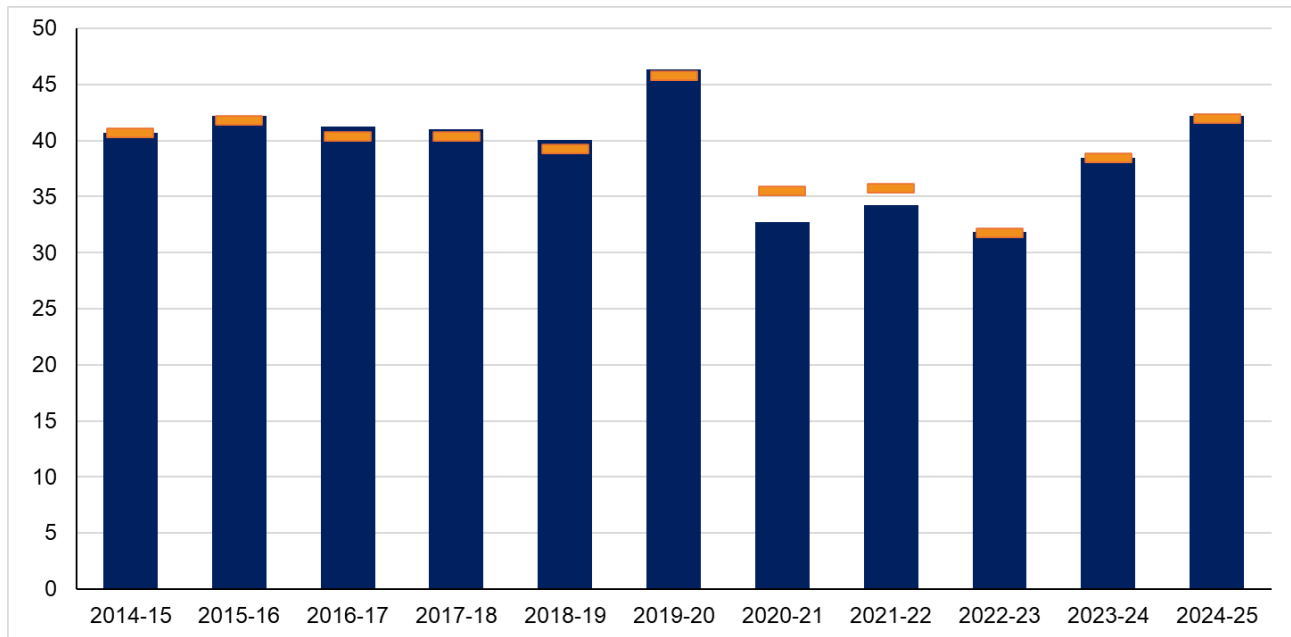
This chart includes Network Rail, CVL and HS1 GB spend and train kilometres.

Quality adjustments are made for train punctuality. Punctuality is calculated as ‘time to 3’ minutes for passenger operators and ‘FDM-R’ for freight operators. Punctuality improved during the pandemic due to reduced traffic but has since returned to pre-pandemic levels. We have not applied a quality adjustment for rolling stock to our infrastructure manager measures, as improvements in rolling stock quality are primarily attributable to train operators rather than infrastructure managers.

- 5.3 If enhancement spend is included in our measure, the productivity trend looks slightly better as Network Rail’s enhancement spend has reduced significantly

(46%) since 2014-15. Productivity – measured by train kilometres per thousand pounds of total spend – appears 9% better than last year and 3% better than 2014–15, as shown in figure 5.2. This is because the input (total spend on OSMR and enhancements) decreased by 5%, while the output (train kilometres) decreased by only 2% over the same period.

Figure 5.2 Train kilometres per thousand pounds of total spend (OSMR and enhancements)

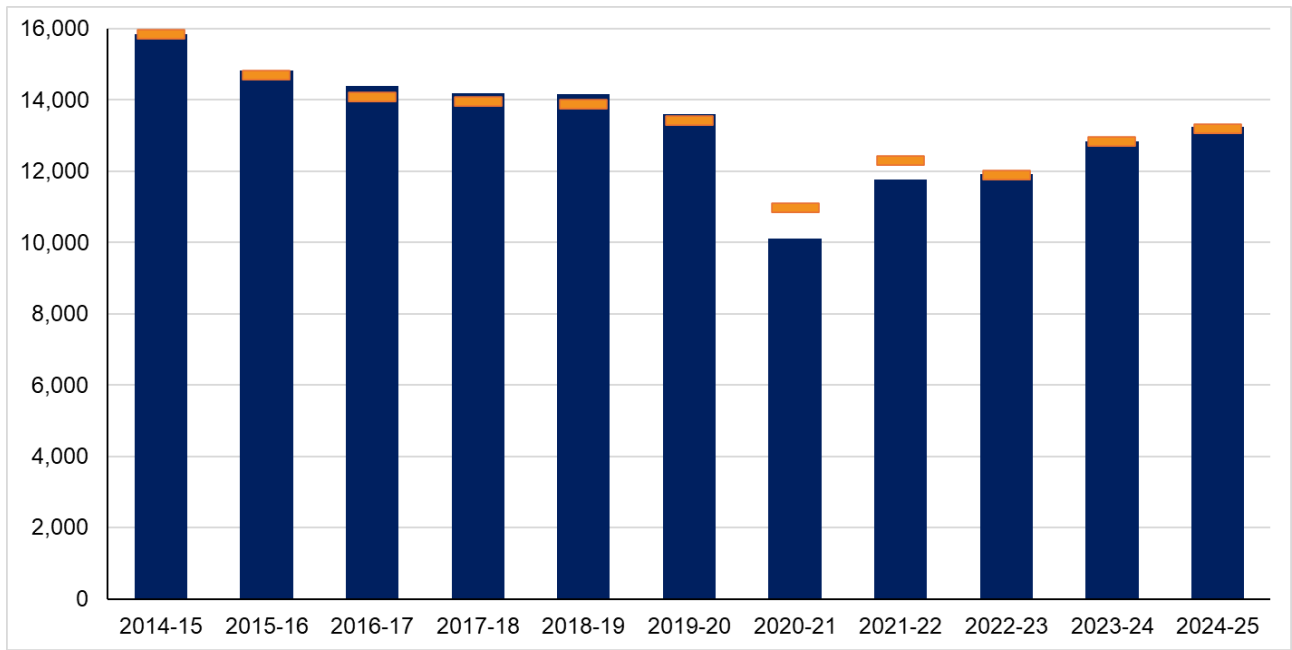


This chart includes Network Rail, CVL and HS1 GB spend and train kilometres.

Quality adjustments are made for train punctuality. Punctuality is calculated as 'time to 3' minutes for passenger operators and 'FDM-R' for freight operators.

5.4 The labour productivity of rail infrastructure, here just focusing on Network Rail due to a lack of data for other infrastructure managers, has increased by 3% since 2023-24 but has declined by 17% since 2014-15, as shown in figure 5.3.

Figure 5.3 Train kilometres per employee (Network Rail only)

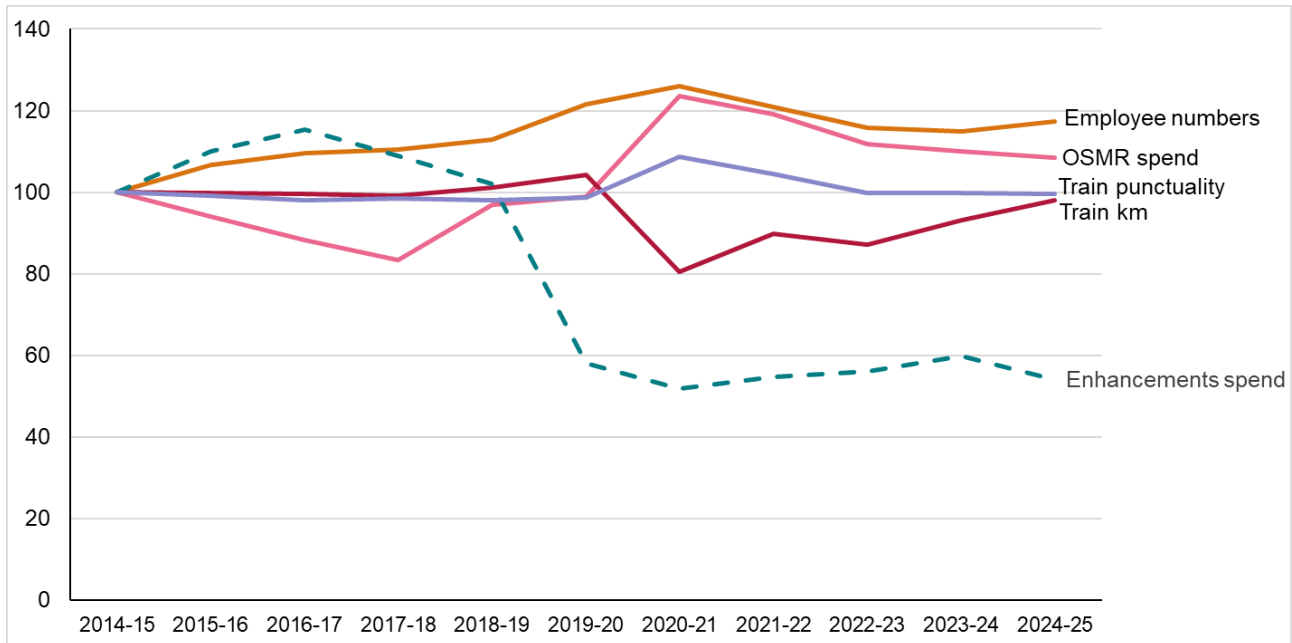


This chart includes Network Rail only due to availability of data for other infrastructure managers.

Quality adjustments are made for train punctuality. Punctuality is calculated as 'time to 3' minutes for passenger operators and 'FDM-R' for freight operators.

5.5 Figure 5.4 summarises the underlying inputs, outputs, and quality adjustments underpinning these productivity measures.

Figure 5.4 Key drivers of Network Rail productivity, indexed to 2014-15



The inputs

- 5.6 Rail infrastructure managers have a high proportion of fixed costs, meaning that a significant share of operational expenditure is incurred regardless of changes in traffic volumes. This is reflected in the relatively limited reduction in costs during the pandemic.
- 5.7 Overall, operations, support, maintenance and renewals (OSMR) expenditure has increased by 5% since 2014-15, but decreased slightly by 2% since 2023-24.
- Operating and support costs have steadily risen by 67% since 2014-15, largely due to higher utility costs and increased staffing costs, particularly in operations management roles.
 - Maintenance expenditure has steadily risen by 57% since 2014-15. This stems from more work on climate adaptations such as on earthworks, drainage, vegetation and safety — which intensified after the Carmont landslip derailment — together with wider use of automation. With funding constrained in CP7, Network Rail is shifting away from asset replacement towards more life-extending maintenance.
 - Renewals expenditure has fluctuated significantly over the decade depending on the mix and timing of projects. Renewals spend is 15% lower than the average for CP6. A more detailed assessment of renewals productivity is provided later in this chapter.
- 5.8 Our headline partial productivity measure excludes enhancement spend because it focuses on operational productivity. Enhancement projects often increase costs immediately, but the resulting outputs - such as additional capacity - often only materialise once projects are completed, sometimes many years later. The spend is also irregular and project-driven, making annual comparisons less reliable. Including it can distort productivity by lowering productivity in investment years and masking operational performance. Network Rail's enhancement spend was high in CP5 (from April 2014 to March 2019) but has since fallen by 46% as investment has been funnelled more towards HS2 instead (which is not a Network Rail managed enhancement).
- 5.9 Network Rail's workforce has increased by 17% since 2014-15, reaching 41,252 staff in 2024-25. This increase is despite recent efforts to reduce headcount, with employee numbers 7% lower than the peak in 2020-21.

- Most of the increase occurred between 2014-15 and 2019-20, when headcount grew 21%. This includes a 7% jump going into 2015-16 due to Network Rail insourcing part of its maintenance and renewals function.
- There was also an increase in headcount in 2020-21, when Network Rail carried out its Putting Passengers First initiative. This was an internal re-organisation to create five regional business units, devolving decision-making to regional teams closer to users. While this aimed to improve responsiveness, it required additional regional recruitment which in some cases led to duplication, with a 4% increase in staff numbers.
- A 2% increase in senior management during 2024-25, with total average remuneration packages increasing by 5% above inflation (CPI) for this group. This continues a trend that has seen director and band 1 level staff increase by 61% over the last decade, to around 661 FTEs.
- A 12% reduction in maintenance headcount since 2014-15, to 14,241 FTEs, largely driven by the Modernising Maintenance programme, which aims to improve workforce rostering and deployment and is expected to deliver further benefits in CP7.
- A 53% fall in the use of agency staff over the past decade, reflecting a shift towards directly employed labour.
- A greater focus on safety, including stricter policies on shift lengths, rest periods and track worker protection increasing staffing requirements.

5.10 Over the same period, the average cost per full-time employee has increased by 4% to around £72,000 per annum. This includes agency staff costs and reflects salary, performance-related pay, overtime, and rising employer national insurance and pension contributions. The increase is likely to be partly driven by the growth in the proportion of senior management grades.

The output: Train kilometres

5.11 Train kilometres were relatively stable prior to the pandemic, but fell during the national lockdowns in 2021-22. While the subsequent recovery has been gradual, train kilometres in 2024-25 were only 2% below 2014-15 levels. This suggests that traffic volumes following the pandemic are not the primary driver of weaker productivity performance. Instead, the combination of higher operational costs and increased headcount has had a greater dampening effect on productivity growth.

5.12 We use train kilometres as the primary output in our Network Rail productivity metrics because they represent a core output of the infrastructure manager. They can also be measured consistently across both passenger and freight services over time. However, there are wider outputs and quality adjustments we can refer to for more context.

Wider outputs

- 5.13 The Composite Sustainability Index (CSI) provides an important indicator of asset condition and long-term sustainability of the rail network. While preserving assets through maintenance rather than replacing and renewing them can support short-term productivity, Network Rail expects that lower levels of renewals and enhancements in CP7, combined with greater reliance on maintenance, will reduce the residual asset life. This is consistent with our Total Factor Productivity findings.
- 5.14 In 2024-25 (the first year of CP7), network-wide CSI shows a 0.4% deterioration relative to the CP6 exit baseline³. Persistent declines in asset sustainability could increase the costs required in future control periods to uphold network performance, with implications for longer-term productivity. For this reason, CSI provides useful context when interpreting headline productivity trends, even though it is not included directly in our productivity metric. See our [Annual Assessment of Network Rail](#) for more detail on CSI.
- 5.15 On a more positive note, rail safety statistics have improved materially over the last decade. Fatalities have reduced by 27%, while the number of more serious injuries on the network has reduced by 16%. This indicates that increased focus and expenditure on safety have delivered tangible benefits, which are not fully captured in the train kilometre output-based productivity measures. See our [rail safety statistics](#) and [assessment of the costs and benefits of health and safety interventions](#) for more detail.

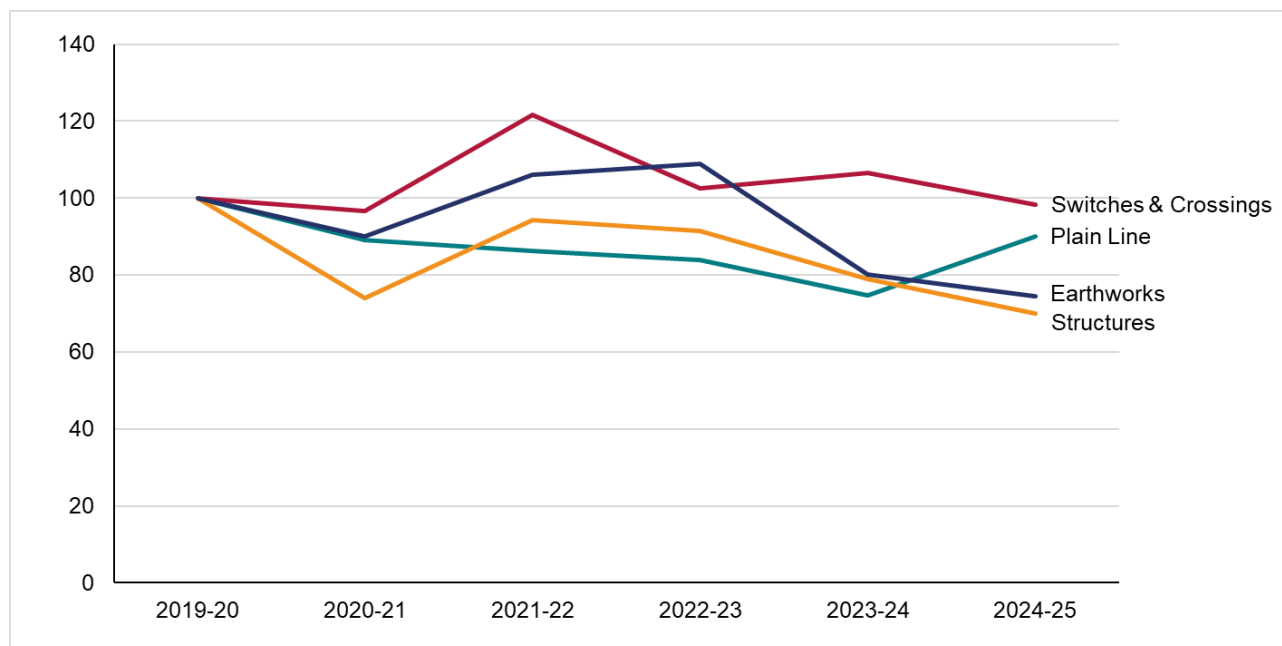
Productivity of renewals delivery

5.16 Analysing train kilometres per pound of spend gives a high-level understanding of the contribution rail infrastructure managers make to industry-wide productivity. However, looking specifically at the volume of renewals delivered per pound gives a more focused picture of productivity in the areas specifically under their control.

³ CSI is now calculated on a slightly different basis from previous years, reducing consistency in the measure over time. For this reason, it was not selected as the headline output for our Network Rail metrics.

- 5.17 In this section, we focus specifically on Network Rail, as it is the largest infrastructure manager in Great Britain—accounting for 99% of total rail infrastructure manager spend—and we have the most detailed data for it.
- 5.18 Renewals are one of Network Rail’s largest areas of expenditure, making up 43% of total operating spend in 2024-25. Renewals expenditure in 2024-25 was 8% lower than 2023-24.
- 5.19 Lower spend does not automatically mean improved productivity when work volumes fall or asset condition declines. Network Rail spent £259 million more than originally expected to deliver its planned volume of renewals in 2024-25.
- 5.20 Renewals productivity is measured as effective volumes delivered per pound of spend, rather than per employee, given that most renewals work is delivered by subcontractors, rather than Network Rail employees.
- 5.21 Effective volumes reflect not only the volume of work delivered, but also reflect how much additional life Network Rail’s activities add to its assets.
- 5.22 Effective volumes have been measured since CP6 (2019-20 to 2023-24), therefore the trends produced are for six years.
- 5.23 Renewals productivity trends depend on the asset type as seen in figure 5.5 below. We have focused on four core areas of effective volumes delivery; plain line track, switches and crossings, earthworks, and structures as these the most important to its operation of the railway’s infrastructure.

Figure 5.5 Index of effective volumes delivered per pound of expenditure, by asset type, indexed to 2019-20



5.24 Productivity has generally been declining or stable, depending on the asset in question. This may be explained by the following factors:

- Network Rail's costs increased during the pandemic due to social distancing, or the requirements to wear more personal protective equipment (PPE);
- Network Rail initially deferred some work at the beginning of the pandemic. Network Rail then realised it could take advantage of the quieter network to take possessions and work on the infrastructure. Fewer trains running meant that longer periods of work could be carried out which particularly benefited switches and crossings delivery in 2021-22;
- increases in some materials costs above general inflation because of global supply issues;
- the impact of industrial action on planned work towards the end of CP6.

5.25 With the exception of plain line track renewals, the decline in productivity has continued in 2024-25.

5.26 **Plain line track renewals** productivity increased by 21% in 2024-25. Following several years of declining volumes, the latest year saw volumes remain broadly

consistent with the previous year. At the same time, costs decreased by 17% in 2024-25. Plain line track renewal costs are primarily influenced by changes in track material prices.

- 5.27 **Switches and crossings** productivity declined by 8% in 2024-25. While volumes have fluctuated over the years, there was a 12% increase in costs in 2024-25, making this the biggest driver in the decline in productivity this year. Delivering renewals for more money than expected hampers productivity as the cost input increases while the output remains the same.
- 5.28 **Earthworks** productivity declined by 7% year-on-year. While volumes delivered were 32% higher than in the previous year, this was outstripped by a 41% increase in costs. Differences in where earthworks are delivered can alter productivity, as the ease and therefore time and cost will change dependent on the location and local geology. For example, softer geology in southern England can be more challenging, and therefore more expensive, than areas with more rock, such as Scotland.
- 5.29 **Structures** productivity declined by 11% in 2024-25, although structures is a complicated area to make year-on-year comparisons given the more bespoke nature of individual structures. The decline was driven by a small increase in costs of 2% in 2024-25, and a reduction of volumes delivered of 9%.

Conclusion

- Network Rail's productivity has not recovered to levels seen a decade ago due to real terms cost pressures and a larger workforce.
- Network Rail's headcount is 17% higher than in 2014-15, including substantial growth in senior management roles, although there have been recent efforts to reduce headcount.
- The impact of the pandemic, industrial action, global supply issues and input price inflation have increased Network Rail's costs since 2014-15.
- Costs have also increased following more emphasis on improving safety, earthworks, drainage and vegetation management.
- Renewals costs have fluctuated with changing priorities and the timing and mix of projects.
- Following funding constraints, CP7's shift toward more maintenance and fewer renewals and enhancements means investment in Network Rail is lower than in CP6.

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- Productivity trends differ by asset type: plain line track improved this year, while switches and crossings, earthworks and structures all saw declines this year.
- The Composite Sustainability Index shows signs of asset deterioration.
- Safety performance has improved.
- Overall train punctuality is broadly unchanged since 2014-15.

6. Total Factor Productivity in rail

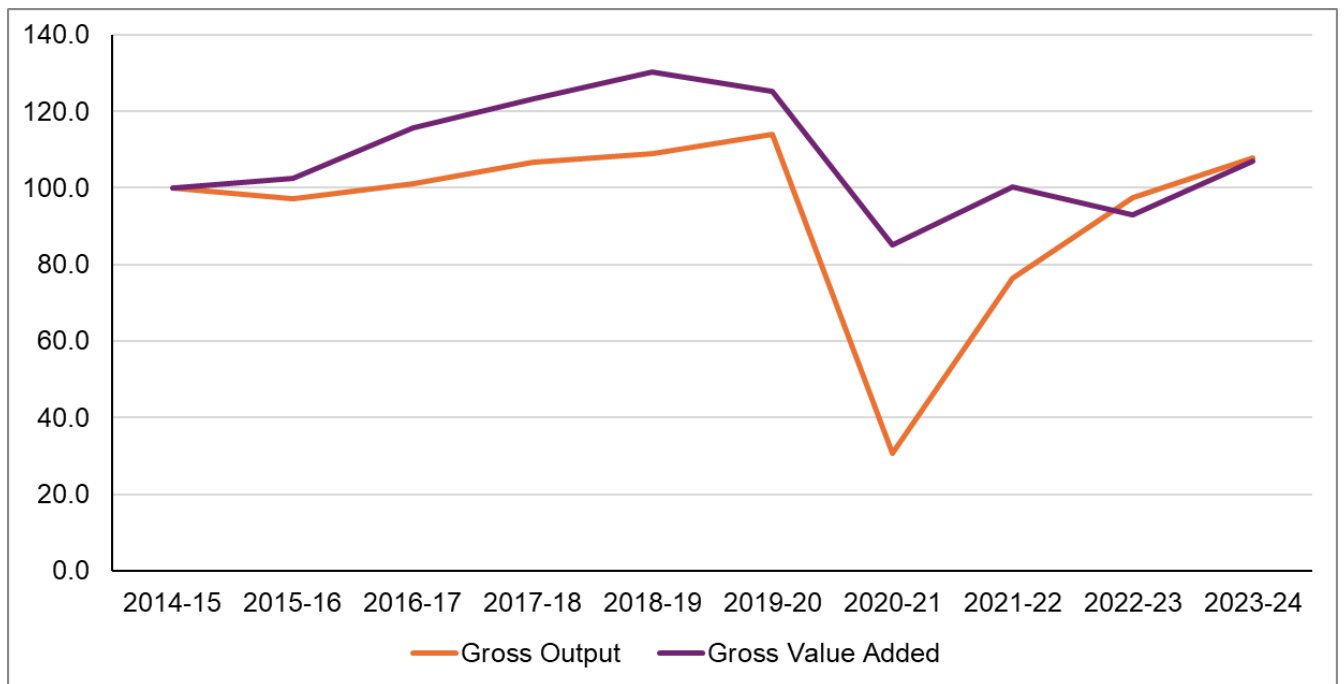
- 6.1 Total Factor Productivity (TFP) is a measure of how efficiently inputs are used in the production process. TFP captures the change in output that is not explained by changes in individual inputs (like capital and labour). For the TFP analysis we contracted independent consultants Europe Economics. Their report is available [here](#).
- 6.2 Unlike the partial measures discussed elsewhere in this report, TFP accounts for all inputs rather than a single input and so provides a more comprehensive measure of productivity.
- 6.3 In this section we use two measures of TFP. One using Gross Value Added (GVA) and the other using quality-adjusted gross output (GO). Quality-adjusted gross output measures the most relevant physical output for the sector (such as train and passenger kilometres) and applies a quality-adjustment in line with the partial measures such as punctuality and quality of rolling stock. Our preferred measure of total factor productivity uses these quality-adjusted GO measures. As well as consistency with the rest of the report, GO measures of TFP are better for non-traded entities such as Network Rail (i.e. for companies whose outputs are not typically sold at free market prices). This is because in calculating GVA for non-traded entities, the value added is often taken as the cost incurred.
- 6.4 GVA represents the difference between the value of output (the value of products and services produced within the industry, such as fares revenue) and the value of intermediate consumption (the cost of inputs and raw materials directly attributable to the railway, such as rail employment costs, or the cost of steel for track). This means that only labour and capital appear as inputs in the TFP GVA calculation.
- 6.5 GVA TFP tends to be higher than GO TFP. This is as GVA removes the value of intermediate inputs when calculating value added.

Whole Industry

- 6.6 GO TFP increased by 11% in 2023-24. The long run trend shows there was a steady growth until 2019-20 after which there was a sharp drop and almost full recovery by 2023-24. GO TFP calculations show productivity now to be 8% higher than 2014-15.

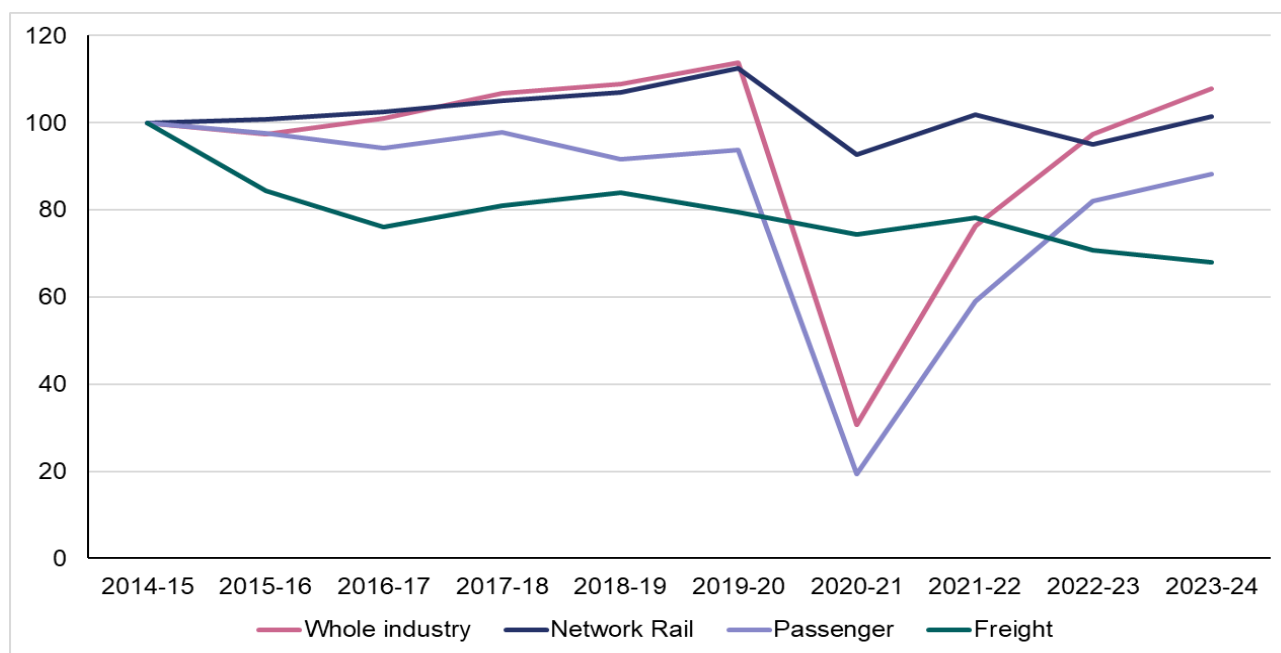
- 6.7 GVA TFP increased by 15% in 2023-24. Again, with an upward trend until 2019-20 and then a period of recovery. GVA TFP calculations show productivity now to be 7.1% higher than 2014-15.
- 6.8 Whilst GO TFP decreased significantly in 2020-21, the reduction in GVA TFP was less significant – largely owing to how Network Rail is reflected in the GVA TFP measure. In GVA, the value added by Network Rail is based on its expenditure, which did not significantly reduce during this period.

Figure 6.1 Whole industry Total Factor Productivity in 2023-24 prices, 2014-15 to 2023-24, indexed to 2014-15



- 6.9 Our preferred measure of quality-adjusted gross output TFP, shown in Figure 6.2 below, is lower in 2023-24 for both freight and passenger operator productivity than in 2014-15. The pandemic impacted both passenger operators and the whole industry measure of TFP significantly.

Figure 6.2 Quality-adjusted Gross Output total factor productivity, indexed to 2014-15



6.10 Table 6.1 below shows down GO and GVA TFP side by side, for both the whole industry and individual industry sectors. Network Rail has seen some gains over the decade regardless of the measure used (and particularly so when measured in GVA terms). Network Rail has increased its productivity both in the latest year and across the decade. This was largely due to Network Rail's renewals capital spend being less than the depreciation costs of the network which could either be due to improved efficiency or insufficient investment to maintain the network.

6.11 However, passenger and freight are below their pre-pandemic levels on both the GO and GVA measures. Over the full period, whole industry productivity has grown by 8% in GO terms since 2014-15, despite the significant shock following the pandemic in 2020-21.

6.12 Using the GO TFP measure, whole industry productivity growth since 2014-15 is higher than growth in the individual rail sectors (Network Rail, passenger operators and freight operators). This is due to different output measures being used for each sector to better reflect their purpose. For example, our whole industry TFP measure uses weighted passenger kilometres and freight tonne kilometres as the output, whereas the Network Rail TFP uses train kilometres. Over the last decade, quality-adjusted passenger-kilometres have risen, while train-kilometres remain broadly flat. At the same time, Network Rail's inputs, which make up a large share of whole-industry inputs, have been falling, largely because renewals and

enhancements expenditure has declined. Together, rising outputs and falling inputs produces a stronger whole-industry TFP growth than the individual sector series.

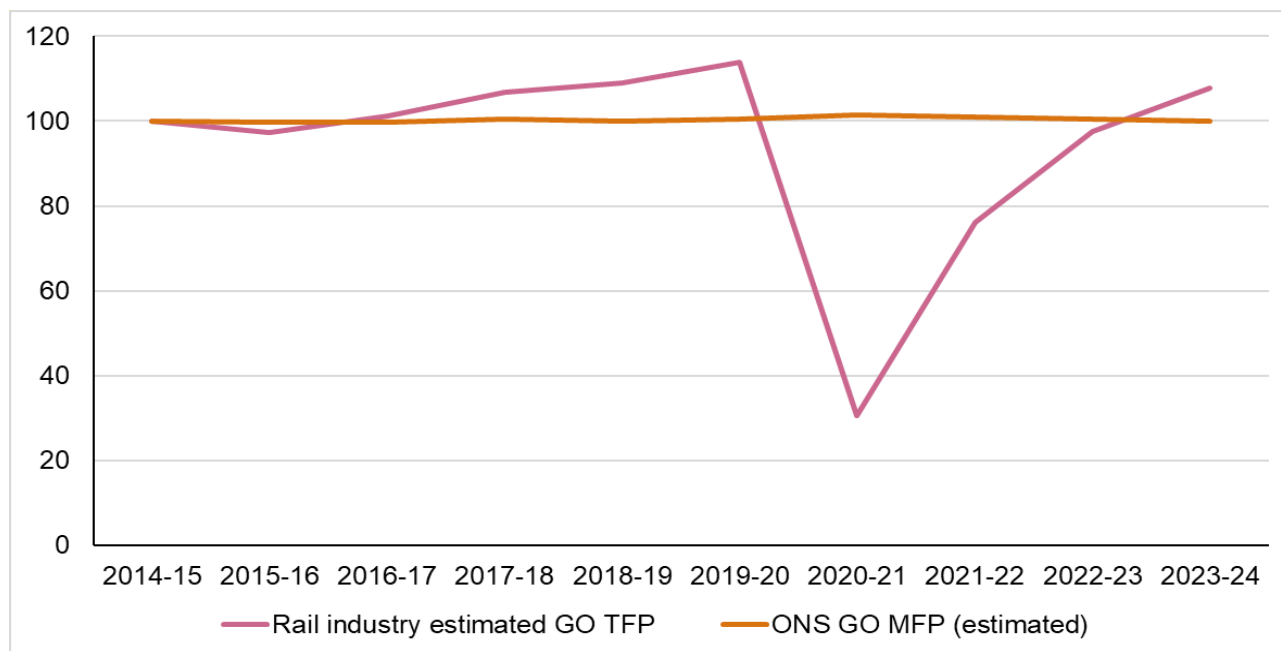
Table 6.1: Growth rates of all industry sectors measured by GO and GVA TFP, present year and since 2014-15

	1 year trend		10 year trend	
	GO	GVA	GO	GVA
Passenger operators	8%	40%	- 12%	- 35%
Freight operators	- 4%	23%	- 32%	- 31%
Network Rail	7%	1%	1%	34%
Whole industry	11%	15%	8%	7%

6.13 In the wider economy productivity growth has remained relatively flat since 2014-15⁴. As shown in figure 6.3 below, our analysis suggests that the rail industry has seen higher productivity growth than the wider economy in recent years, although there was more volatility over the decade. This is because the rail industry is more susceptible to rapid changes in passenger demand and has high levels of fixed costs that do not fall when demand is reduced (as happened during the pandemic).

⁴ [Annual multi-factor productivity, market sector, UK - Office for National Statistics](#)

Figure 6.3 Comparison of rail industry TFP indices with ONS MFP for the whole UK economy, indexed to 2014-15



6.14 Whole-industry productivity appears stronger using TFP than under the partial productivity measures explored in chapters 2 to 5 because each approach uses slightly different inputs and outputs. TFP uses weighted passenger-kilometres and freight-tonne-kilometres as the output, which have grown modestly overall, increasing productivity. Passenger kilometres are up 3% versus 2014-15, which offsets the decline in freight tonne kilometres. In contrast, our partial productivity measure uses train-kilometres, which were less volatile during the pandemic because services continued to run even when demand fell, although they remain slightly below 2014-15 levels (down 2% versus 2014-15).

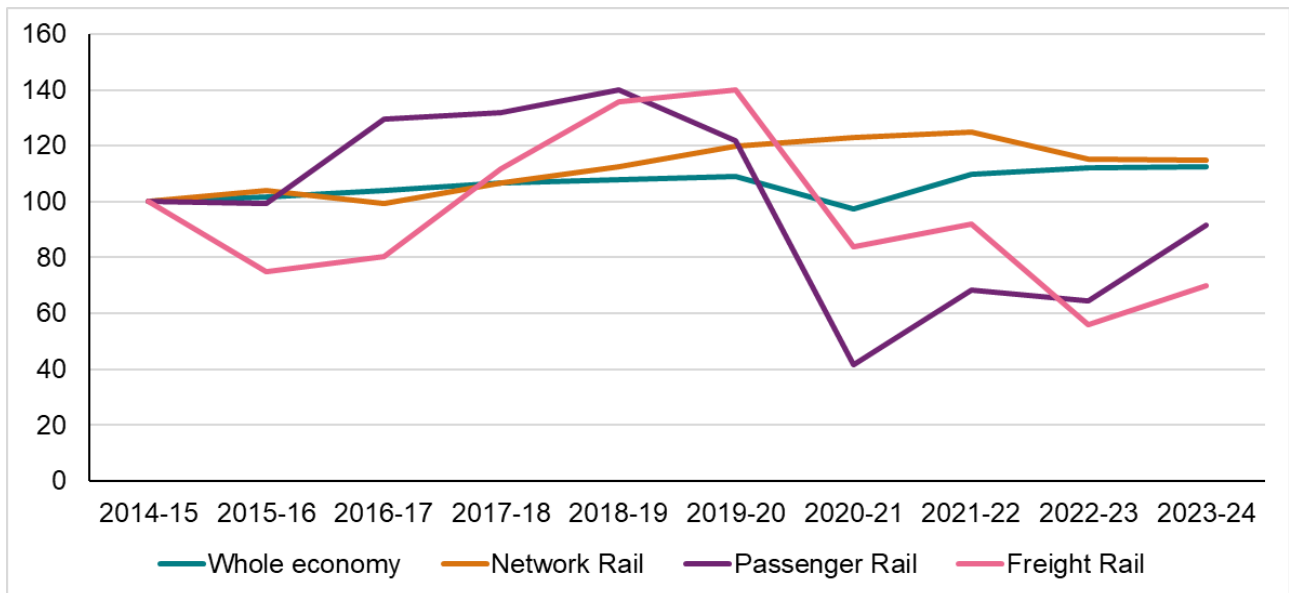
6.15 The approaches also differ in how they measure inputs. TFP examines the value of the rail network as an input. The infrastructure asset value has fallen in real terms because depreciation has exceeded new investment in renewals and enhancements. This has led to increased capital productivity offsetting the reduction in labour productivity. This means Network Rail has delivered a modest increase in output while its measured inputs have fallen, resulting in rising productivity under TFP. As capital investment in renewals and enhancements is below depreciation, care will be needed to ensure that this increased productivity does not come at the expense of a decline in asset health and sustainability.

6.16 A full list of the outputs and inputs used can be found in the table in Annex C, as well as other physical outputs tested. A further discussion is provided in the Europe Economics report.

Economic Contribution of the Railways

- 6.17 In 2023-24, the rail industry contributed £10.3 billion to the economy in Gross Value Added (GVA). This comprises £5.6 billion for Network Rail, £4.4 billion for passenger operators and £0.3 billion for freight operators. The economic contribution for passenger and freight increased by 42% and 25% year on year, largely as a result of increased passenger demand, whereas Network Rail has seen lower growth with an increase of 0.4% over that 12 month period (2022-23 to 2023-24).
- 6.18 These values are different to the GVA TFP measures described earlier in this chapter, because they are the total value added by each sector of the industry, rather than looking at the growth in output (GVA) relative to the growth in inputs (labour and capital).
- 6.19 Figure 6.4 below shows how GVA has changed since 2014-15. Network Rail’s contribution has remained relatively stable over the decade with a slight increase during the pandemic. As noted previously, this is largely because of the valuation of Network Rail’s output is based on the value of its resources used. Freight and passenger operator GVA increased from 2014-15 and then dropped sharply in 2020-21 due to the pandemic. Passenger operator GVA has been recovering and has reached 65% of 2019-20 levels. Freight operator GVA has also been volatile in recent years but overall is showing a downward trend.

Figure 6.4 Gross Value Added (in 2023-24 prices) indexed to 2014-15



Economic Contribution per employee

- 6.20 GVA per employee for 2023-24 increased compared to 2022-23 for passenger and freight operators by 39% and 19%, respectively. Network Rail GVA per employee changed by 0.4%.
- 6.21 Figures 6.5 and 6.6 below show GVA per employee since 2014-15 for the rail industry overall and its sectors, and for the wider economy. Passenger operator GVA per employee has been increasing since the drop in 2020-21 but is yet to reach pre-pandemic levels and has trended below the wider economy. Freight GVA per employee has been fluctuating in a downward trend since 2019-20. Network Rail GVA per employee has remained stable since 2014-15, including during the pandemic.

Figure 6.5 Gross Value Added per employee (in 2023-24 prices)

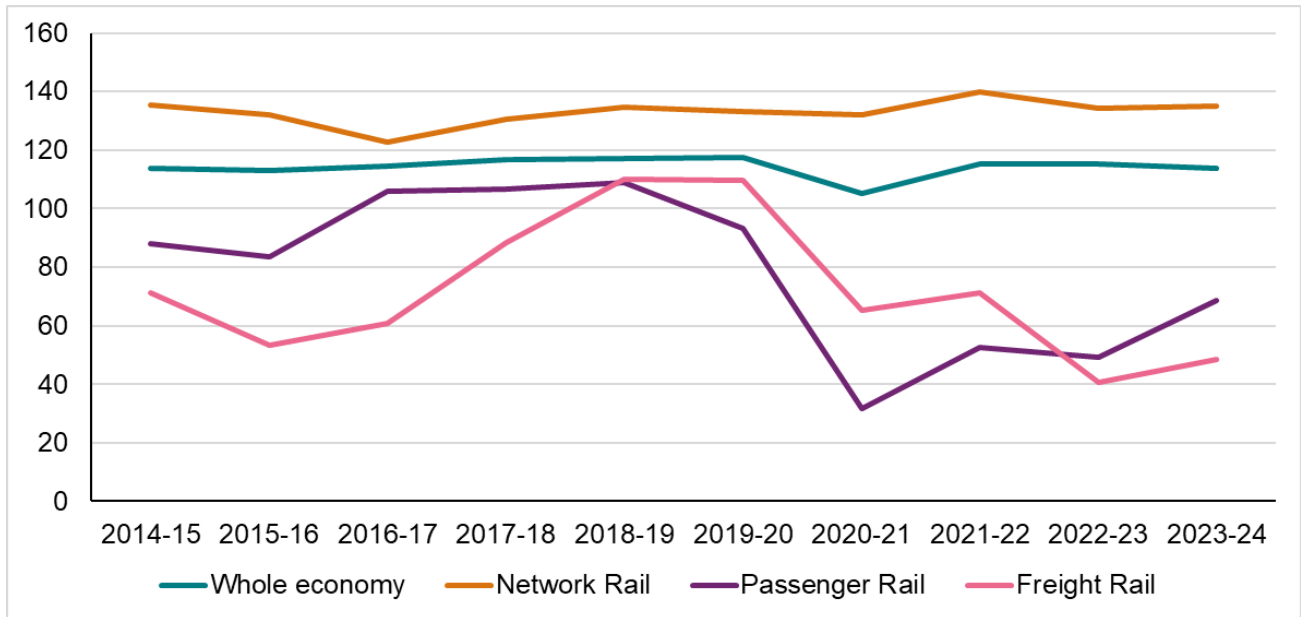
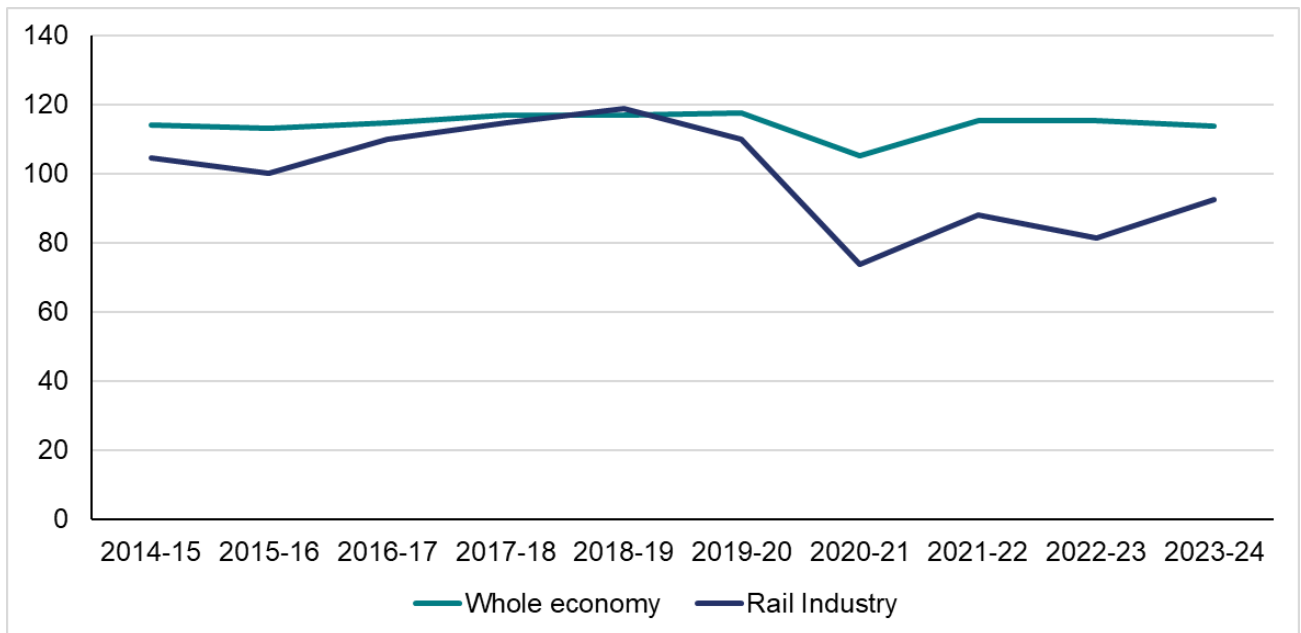


Figure 6.6 Gross Value Added per employee (in 2023-24 prices)



6.22 We note that the rail industry is an enabler of wider economic activity. Research by the has suggested that the rail industry’s economic contribution is higher than its direct GVA. This research found the economic contribution of rail was £42.9 billion. This was broken down to show £12.2 billion in direct value added and additional value from induced effects, supply chains and station retail. According to these results £1 spent on the railway leads to a further £2.50 generated externally within associated suppliers and firms.

Annex A: Summary of all metrics

Quality adjusted productivity metrics	Trend since 2014-15	%change vs 2014-15	%change vs last year
Industry wide metrics			
Train kilometres per £ of total expenditure		2%	4%
Train kilometres per £ of operating expenditure		-6%	3%
Train kilometres per rail employee		-18%	1%
Gross value added per employee		-12%	14%
Total Factor Productivity(GO)		8%	
Passenger train operator metrics			
Train kilometres per £ of expenditure		-17%	0%
Train kilometres per rail employee		-19%	0%
Passenger kilometres per £ of expenditure		-14%	2%
Passenger kilometres per employee		-16%	2%
Average vehicle kilometres per vehicle		-8%	4%
Average vehicle load factors		-7%	2%
Average number of vehicles per train		11%	0%
Passenger journeys per £ of expenditure		-12%	2%
Gross value added per employee		-22%	39%
Total Factor Productivity(GO)		-12%	
Freight train operator metrics			
Freight train kilometres per £ of expenditure		-3%	5%
Freight train kilometres per employee		-28%	1%
Freight tonne kilometres per £ of expenditure		-7%	8%
Freight tonne kilometres per employee		-31%	5%
Average vehicle load factors		-16%	-1%
Average number of vehicles per train		14%	4%
Gross value added per employee		-32%	19%
Total Factor Productivity(GO)		-32%	
Infrastructure metrics			
Train kilometres per £ of total expenditure		3%	9%
Train kilometres per £ of operating expenditure		-7%	7%
Train kilometres per employee		-17%	3%
Plain Line effective renewal volumes per £ of expenditure		n/a	21%
Switches & crossings effective renewal volumes per £ of expenditure		n/a	-8%
Structures effective renewal volumes per £ of expenditure		n/a	-11%
Earthworks effective renewal volumes per £ of expenditure		n/a	-7%
Gross value added per employee		0%	0%
Total Factor Productivity(GO)		1%	

Annex B: Passenger operator comparisons

TOC	Category	Expenditure*		Labour**		Rolling stock		
		Passenger km per £	Passenger journeys per £	Passenger km per employee	Passenger journeys per employee	Passenger km per £ of rolling stock	Vehicle utilisation (vehicle kms per vehicle)	Load factors (passengers per vehicle)
Ranking (1 is best performing, while 24 is worst performing)								
Lumo	Long Distance (OA)	1	20	1	19	2	2	1
Hull Trains	Long Distance (OA)	2	19	3	18	1	3	2
Grand Central	Long Distance (OA)	4	23	7	23	15	10	3
CrossCountry	Long Distance	6	15	11	14	16	5	6
Avanti West Coast	Long Distance	9	21	8	21	18	1	11
London North Eastern Railway	Long Distance	5	22	5	22	17	4	5
East Midlands Railway	Long Distance	11	17	19	17	12	6	9
Great Western Railway	Long Distance	16	16	14	13	24	8	8
Elizabeth line	London and South East	13	2	2	1	5	18	10
c2c	London and South East	10	4	6	3	9	22	16
Greater Anglia	London and South East	3	6	4	5	4	13	18
Govia Thameslink Railway	London and South East	8	5	9	4	13	15	19
Chiltern Railways	London and South East	7	11	10	10	7	14	4
London Overground	London and South East	20	1	12	2	8	24	12
South Western Railway	London and South East	12	7	15	7	10	17	15
Southeastern	London and South East	19	8	17	8	14	20	21
Heathrow Express	London and South East (OA)	24	13	13	6	6	9	24
TransPennine Express	Regional	14	18	18	15	20	7	7
West Midlands Trains	Regional	15	10	16	11	11	11	14
Merseyrail	Regional	17	3	21	9	3	23	13
ScotRail	Regional	18	9	21	11	19	16	22
Northern Trains	Regional	22	12	23	15	21	19	17
Caledonian Sleeper	Regional	21	24	19	23	22	12	23
TfW Rail	Regional	23	14	22	17	23	21	20

* Expenditure excludes fixed track access charges

** Excludes station staff

(OA) denotes open access operators

All metrics are quality adjusted

Annex C: Methodology

This report brings together productivity measures from over 30 rail industry companies over an 11-year period. We have included franchised (government funded) passenger operators, open access (non-franchised, or non-government funded) passenger operators, freight operators, Network Rail, HS1 Ltd and CVL (where the data is available). Our analysis covers Great Britain but excludes Northern Ireland.

Partial productivity measures

Productivity is defined as a ratio between outputs and inputs.

Productivity increases when more (or higher quality) outputs are delivered with the same or fewer resources.

Our partial productivity measures primarily use two key inputs:

- **Expenditure**, which is the input for our headline metric, providing a comprehensive view of the entire industry. This approach captures labour, infrastructure and rolling stock productivity, ensuring consistency across different parts of the rail sector. It also accounts for both outsourced services and in-house operations.
- **Employee numbers**, which are used as an input elsewhere in the report, particularly for key productivity metrics related to passenger and freight operators, as well as Network Rail. While labour-based metrics may not fully capture the level of outsourced services, they offer a simpler measure of productivity, reflecting the critical role of the workforce in the UK rail industry. Labour-based metrics are also less affected by external factors such as exchange rate fluctuations and input price changes, which could distort expenditure-based measures.

We use various output metrics, depending on the availability and comparability of data, and which output is most relevant to the measure of productivity we are developing. The outputs used in our analysis include:

- **train kilometres**, which refer to the train distances travelled on Network Rail, Core Valley Lines, HS1, and TfL infrastructure. Empty coaching stock movements are included. This output can be used for both freight and passenger operators and therefore provides a comprehensive view of the entire industry. Our analysis focuses on GB train kilometres and spend only, excluding Eurostar.

- **vehicle kilometres**, which refer to the vehicle distances travelled on the GB network. A train with a locomotive and four carriages travelling one kilometre will generate one train kilometre and five vehicle kilometres.
- **passenger kilometres**, which are calculated by multiplying the number of passenger journeys on a particular flow by the number of corresponding track kilometres between stations. If one train carrying 200 passengers travels 10 kilometres, we would report 10 train kilometres, 200 passenger journeys and 2000 passenger kilometres (200 multiplied by 10 kilometres). We use passenger kilometres as the output for most of our passenger operator metrics as it captures the combined effect of passenger numbers and travel distances, indicating how much the railway service is being utilised.
- **passenger journeys**, which are estimated using ticket sales data. For the purpose of these statistics, where travel requires one or more changes of train, each train used is counted as one journey.
- **freight tonnes lifted**, which refers to the mass of goods (tonnes) carried on the rail network, excluding the weight of the locomotives and wagons. This measure takes no account of the distance travelled.
- **freight tonne kilometres**, which are the amount of freight which is moved on the railway. Freight moved is measured in net tonne kilometres and covers the net weight of the goods carried and the distance carried. If one train carrying 400 tonnes of freight travels 10 kilometres, we would report 10 freight train kilometres, 400 tonnes of freight lifted and 4,000 freight tonne kilometres.
- **Network Rail effective renewal volumes**, which measure how much additional life Network Rail's renewal activities add to its assets, which provides a medium-term view of asset sustainability. It is calculated as a weighted aggregation of renewals volumes, where the weighting distinguishes between activity types and their different impacts on asset life.
- **Gross Value Added** provides a value for the services provided, minus the cost of all inputs and raw materials that are directly attributable to that service (see GVA section below for more detail).

This report largely draws upon information that is already in the public domain, including ORR's official statistics as published on ORR's data portal. Table A.1 summarises the sources utilised in calculating our metrics.

Sources used in calculating our metrics

Data	Source	
Distance travelled	Freight train kilometres	Table 1333
	Freight vehicle kilometres	Table 1343
	Passenger train kilometres	Table 1243
	Passenger kilometres	Table 1230
	Passenger vehicle kilometres	Table 1253
Other industry outputs	Passenger journeys	Table 1223
	Freight tonnes moved	Table 1310
	Network Rail effective renewal volumes	Provided to ORR by Network Rail
Number of employees	Number of passenger train operator employees	Table 2233
	Number of freight operator employees	Companies House
	Number of Network Rail employees	Network Rail's regulatory financial statements and information
Expenditure	Franchised passenger train operator expenditure	Table 7226
	Non franchised passenger train operator expenditure	Table 7233
	Freight train operator expenditure	Table 7243
	Network Rail expenditure	Table 7216 and Network Rail's regulatory financial statements
Rolling stock	Rolling stock age	Table 6313
	Rolling stock vehicle numbers	RDG Table 6314
Quality of service	Passenger train delays	Table 3138
	Passenger train cancellations	Table 3123
	Freight Delivery Metric (delays)	Table 1324
	Freight cancellations and lateness	Table 1365

Train Operating Companies

Franchised passenger operators

Franchised passenger operators run services under contracts awarded by franchising authorities (DfT, Transport Scotland, Transport for Wales, Transport for London, and Merseytravel) and operate under service requirements set by these bodies. We have used operators' management accounts data in our analysis.

Non-franchised (open access) operators

Open access operators operate without taxpayer subsidies. Data is provided for four open access operators: Grand Central, Heathrow Express, Hull Trains, and Lumo. Financial data is based on bespoke returns to ORR and published financial accounts, where available. Financial data for Hull Trains for April 2024 to March 2025 was not available. An estimate was therefore made for the latest year using data held for 2023-24 and uplifted for inflation.

Freight operators

Freight operator financial information is sourced from statutory accounts. An estimate of freight expenditure was made when data was unavailable, using data held for other years, adjusted for inflation.

Rail Infrastructure

Network Rail

Network Rail financial information is primarily based on its regulatory financial statements for the financial year.

The exception to this is the data used in analysing Network Rail's renewals productivity, which is based on reporting provided by Network Rail to ORR. This data does not have the same status as official statistics data used elsewhere in our analysis. However, the data quality is considered sufficiently robust to support the high-level analysis we have undertaken.

We analyse the productivity of Network Rail's delivery of four core assets, which are defined below. We have analysed Network Rail's core renewals, as these are the most important to its operation of the railway's infrastructure. We have excluded those core renewals where there was insufficient data available, or the inherent characteristics of the assets made analysis impractical.

Definitions of core assets

Core asset	Definition
Plain line track	Sections of track without switches and crossings (see below).
Switches and crossings	Moveable sections of track that guide trains from one track to another and allow them to cross paths.
Structures	In this context, bridges (either going over the railway or going under the railway).
Earthworks	The cuttings (to lower the track from surrounding terrain) and embankments (to raise the track above surrounding terrain) required for the railway to remain on a level path, or a safe gradient.

HS1 Limited

High Speed 1 Limited has a 30-year concession to operate and manage the railway between London St Pancras and the Channel Tunnel. Our data is sourced from its financial accounts. While HS1 is included within our spend metrics, it has been excluded from some of the more detailed rail infrastructure analysis (in our FTE and volumes metrics) due to the lack of available data. Our analysis focuses on GB train kilometres and spend only, excluding Eurostar.

Core Valley Lines (CVL)

The Core Valley Lines (CVL) network was transferred from Network Rail to Transport for Wales on 28 March 2020. While the CVL is included within our spend metrics, it has been excluded from some of the more detailed rail infrastructure analysis (in our FTE and volumes metrics) due to the lack of available data. Financial data is based on bespoke returns to ORR.

Our Adjustments

Quality adjustments

Passenger operators

We make quality adjustments to passenger operator outputs by multiplying distances travelled by the ‘Time to 3’ percentage as published on the [ORR data portal](#), indexed to 2014-15. ‘Time to 3’ is a measure of punctuality and reflects the percentage of recorded station stops arrived at early, or less than three minutes after the scheduled arrival time.

We have used ‘Time to 3’ to adjust passenger train kilometres because of its close links to the ‘On time’ measure we currently use to measure Network Rail’s performance, with a recognition that for long distance services most customers are likely to be less concerned about short delays. Following our [review and consultation on the train performance reset](#), ‘Time to 3’ will

become the main success measure for England and Wales train punctuality for years 3 to 5 of the current control period (Control Period 7) for Network Rail.

More insight into the methodology used for ORR's passenger rail performance metrics can be found in the [passenger rail performance quality and methodology report](#)

In this year's report we have also quality-adjusted passenger operator outputs (where productivity is measured as passenger kilometres per thousand pounds of spend) for the relative age of rolling stock compared to 2014-15. If the average age of rolling stock decreases compared to 2014-15, productivity outputs are multiplied upwards by the percent change in age. For example, a decrease in age of 5% would result in productivity outputs being multiplied by 105%.

We have applied this adjustment to acknowledge the benefit of investment in rolling stock for passengers, who will travel on more comfortable and reliable trains, with improved services.

Freight operators

We also apply a quality adjustment for freight operators, using punctuality to stay consistent with the adjustments applied to passenger operators in the whole-industry measure. We make quality adjustments to freight operator outputs by multiplying freight tonne kilometres by the Freight Delivery Metric (FDM) percentage. FDM measures the percentage of commercial freight trains that arrive at their planned destination within 15 minutes of their booked arrival time, or with less than 15 minutes of delay.

FDM can be found on our [data portal](#).

More insight into the methodology used for ORR's freight rail performance metrics can be found in the [freight rail usage and performance quality and methodology report](#).

Network Rail

We make quality adjustments to Network Rail outputs by multiplying passenger train kilometres by the on time to 3 percentage and by multiplying freight train kilometres by the on time to 15 minutes (FDM) percentage, as explained above.

We do not apply a quality adjustment for rolling stock to our Network Rail measures, as improvements in rolling stock quality are primarily attributable to train operators rather than Network Rail.

Industry-Wide

We make quality adjustments to outputs by multiplying passenger train kilometres by the 'Time to 3' percentage and by multiplying freight train kilometres by the on time to 15 minutes (FDM) percentage, as explained above.

We also apply a quality adjustment for rolling stock to our expenditure based measures (not to our labour based measures). If the average age of rolling stock decreases compared to 2014-15, productivity outputs are multiplied upwards by the percent change in age. For example, a decrease in age of 5% would result in productivity outputs being multiplied by 105%. We have applied this adjustment to acknowledge the benefit of financial investment in rolling stock for passengers, who will travel on more comfortable and reliable trains, with improved services.

Financial adjustments

Network Rail financing costs

We have excluded Network Rail's financing costs from the calculation of Network Rail's expenditure. A large proportion of Network Rail's finance costs relate to historic index-linked debt over which Network Rail has limited control, and which is funded separately from its operations, support, maintenance and renewals expenditure.

Industry-wide consolidation adjustments

For the industry-wide metrics, we have made consolidation adjustments to remove intra-industry costs which are charged from one part of the industry to another, for example the access charges which are paid by train operators to Network Rail and HS1 Limited. This is consistent with the approach in our Rail Finance (UK) report. In 2023-24, this resulted in £3.1 billion being removed from industry income and expenditure.

Consumer Price Index (CPI) adjustments

CPI is used throughout our analysis to adjust for the effect of inflation and all numbers are in a consistent April 2024 to March 2025 price base, unless otherwise stated. More insight into the methodology used for our Rail Finance (UK) report can be found in the [rail industry finance quality and methodology report](#).

Limitations to our adjustments

This report is subject to a quality assurance process and data is shown on a comparable basis where possible. However, the following limitations exist:

- Changes to accounting standards and / or the categorisation of costs may affect the way costs are reflected in our analysis (particularly for rolling stock cost analysis);

- Most companies included in this report prepare financial data on an April to March financial year basis, however some companies prepare accounts on a calendar basis (January to December); and
- Some TOCs will outsource some parts of their operations, which may affect comparisons between companies, especially for headcount. For example, some operators are responsible for station management while others are not. See our [data portal](#) for more details.

Total Factor Productivity

Total Factor Productivity (TFP) estimates the change in output whilst accounting for any changes in input. The residual output not explained by a change in input is total factor productivity. This is a comprehensive approach to productivity analysis, capturing not only individual inputs but also the efficiency with which labour and capital are combined.

The analysis uses two approaches to calculate TFP. Firstly, we use gross output (GO), this is calculated by measuring the growth in physical output – such as km travelled, and comparing this with the growth of inputs – which are capital, labour and intermediate consumption. For the GO TFP measure, we have applied quality adjustments to the output consistent with the approaches taken in the rest of this report, based on km travelled, with capital, labour, and intermediates inputs. Secondly, we use Gross Value Added (GVA) as an output with capital and labour inputs.

For GO there is a quality adjustment to reflect the quality of service. The GVA series is not quality adjusted as the financial measure of value implies quality has been accounted for.

Input and output measures

	Inputs	GVA	GO measure	Quality Adjustment
Network Rail	Labour: FTE count and staff costs Capital: renewals and estimated enhancements expenditure Intermediates: expenditure on operations, support and maintenance (OSM), traction electricity, industry costs, and rates	Employee compensation plus capital depreciation from annual accounts	Passenger train km + freight train km	Weighted combination of TOC and FOC adjustments

TOCs	Labour: FTE count and staff costs Capital: Rolling stock, property, other equipment and vehicles, intangibles Intermediates: total cost, minus staff and depreciation cost, exceptions and adjustments.	Estimated from ONS data	Passenger km	On-time to 3 and average age of rolling stock
FOCs	See TOCs	Estimated from ONS data	Freight-tonne km	On-time to 15
Whole industry		Aggregated total for Network Rail and Operators	Weighted combination of passenger-km and freight tonne-km	

Europe Economics opt to use the DfT’s Depreciated Replacement Cost (DRC) valuation of assets as opposed to a Regulatory Asset Base (RAB) valuation. This is because the DRC valuations are designed to reflect current market replacement cost which decreases with age of the asset, whereas RAB is influenced by the asset’s actual purchase price and may not correspond directly to their productive capital.

Sources

All input costs are sourced from financial accounts on Companies House.

GO measures and quality adjustments are taken from ORR data portal.

GVA sources are detailed below.

GVA

Gross Value Added can be used to establish the contribution of the rail industry to the wider economy. The passenger, freight and Network Rail GVA data in our analysis is based on the following sources:

ONS GVA is based upon comprehensive National Accounts data. This is the nationally recognised measure of GVA, used in the UK National Accounts and regional economic statistics. It covers the entire economy.

Approximate GVA (aGVA) is based upon the ONS’s Annual Business Survey (ABS) and is used to estimate the value generated by businesses within an industry. The measure focuses

upon sectors like production, construction, distribution, and services and the data available is on a more granular basis than the National Accounts.

Network Rail annual reports enable GVA to be measured by adding total employee compensation and capital depreciation. This method is used for calculating Network Rail's GVA where there is insufficient granularity in the ONS data.

Passenger and freight operator GVA

Our ORR GVA measure for train operators takes a representative proportion of the ONS transport GVA data. This proportion is estimated based on the more granular aGVA data (i.e. the value aGVA gives for the passenger and freight rail industry as a proportion of the Land Transport industry).

This is taken from the adjusted GVA figures for passenger rail transport from SIC Code 49.1 and freight rail transport from SIC Code 49.2. SIC stands for Standard Industrial Classification, and the codes are used to classify businesses according to their primary economic activity.

Network Rail GVA

Network Rail GVA has been approximated from the company's annual reports in a method also used in [The Economic Contribution of UK Rail paper](#) published in 2021.

This alternative method calculates GVA by adding together Network Rail's total employee costs plus capital depreciation.



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