OFFICE OF RAIL AND ROAD

MONITORING THE IMPACT OF, AND RESPONSE TO, OPEN ACCESS

Appendix 1: Economic Appraisal

28 April 2022

SYSTRA

Contents

1. Introduction

1.1 This appendix outlines the impact that entry of open access operators into the GB rail market have had on the UK economy. It presents an appraisal of the economic and environmental impacts of the entry into the market of open access operators based on standard industry techniques used to estimate the monetary value of the impact. The economic appraisal is based on an assessment of:

- The number of passengers using the rail network before and after the open access services commenced operation.
- The changes to the average fares paid by passengers, and hence the amount of revenue earned by the operators.
- The changes in the journey times in getting between locations on the network.

1.2 This report presents each of the individual components that are used to drive the economic appraisal, in order to set out the changes that are occurring on each of the different flows and to help understand what is driving the results of the economic appraisal.

1.3 Economic appraisal estimates the benefits of a change in the provision of transport services to both users and non-users.

1.4 Users benefit through reductions in the time it takes to make a journey and reductions in the fare they pay for their journeys. Users who would have made the journey regardless of the change will all be assumed to receive the full benefit. Users who switch to making the journey are assumed to only benefit when the time and/or cost gets below a certain level. The standard industry techniques estimate the benefits to these users switching. In order to estimate the user benefits we need to know the demand that would have made the demand regardless of the change, and the demand generated by the change, as well as the journey times and fares paid in both situations.

1.5 Non-users benefit through more revenue being received for journeys as a result of the change, and this is simply calculated as the difference between the revenue that would have been achieved without the change and the revenue achieved with the change. As well as understanding the expected demand with and without the change, we also therefore need to know the average fare paid with and without the change.

1.6 The assessment of the environmental impacts of the entry of open Aaccess operators into the market, is based on the application of standard industry techniques to estimate the amount of vehicle mileage taken off the roads, and the reduction in emission and noise that result from this reduction in vehicle mileage; in addition, the reduction road vehicle mileage results in a reduction in congestion. Consideration is also given of any emissions generated by the rail services themselves.

Case studies

1.7 There were two open access operators with a substantial history of operating services on the GB rail network at the time of this study[1]:

- Hull Trains which has operated a Hull to London service since September 2000.
- Grand Central which has operated a Sunderland to London service since December 2007 and a Bradford Interchange to London service since May 2010.

1.8 Ten Case Studies have been selected for this review, with case studies chosen for each of the three routes, and for a mixture of Long Distance London, Short Distance London and non-London flows. The Case Studies are listed in Table 1.1.

[1] Excluding Heathrow Express which operates in a very specific market. Data was not available for Lumo when this study was completed.

Table 1.1 Selected Case Studies

Case Study	Route	Operator	Flow Type
Hull to London	Hull to London	Hull Trains	Long Distance London
Selby to London	Hull to London	Hull Trains	Long Distance London
Doncaster to London	Hull to London Bradford to London	Hull Trains Grand Central	Long Distance London
Grantham to London	Hull to London	Hull Trains	Short Distance London
Sunderland to London	Sunderland to London	Grand Central	Long Distance London
Hartlepool to London	Sunderland to London	Grand Central	Long Distance London
York to London	Sunderland to London	Grand Central	Long Distance London
Hartlepool to York	Sunderland to London	Grand Central	Non-London
Bradford to London	Bradford to London	Grand Central	Long Distance London
Bradford to Doncaster	Bradford to London	Grand Central	Non-London

Control flows

1.9 As well as the case studies for flows served by open access operators, Control Flow Case studies have been chosen to examine the changes in demand, fares and revenue that have taken place on flows without open access operators. The control flows have been selected on the basis of the following criteria:

- A mix of long distance London flows, short distance London flows and non-London flows.
- Data is available in the same data set as the data for the case study flows.
- Flows which are served by regular direct services and have not been directly impacted by open access operators.
- Flows which have not been significantly impacted by external factors.

1.10 The flows listed in Table 1.2 are used as Control Flow Case studies, which have been combined into average flows for each of the flow types used. The chosen control flows represent a selection of those initially examined, as analysis of other control flows that were considered found the data to be unsuitable.

Table 1.2 Control Flows

Control Flows	Flow Type
Sheffield to London	Long Distance London
Leeds to London	Long Distance London
Leicester to London	Long Distance London
Kettering to London	Short Distance London
Liverpool to Preston	Non-London

1.11 The control flows will be used as one approach to estimate the changes in demand and average fares that would have occurred without the introduction of the open access operator services. They are in effect being used to show what level of growth might reasonably have been achieved without open access operators.

1.12 There are, however, limitations to the used of the control flows, which are set out below so that these can be considered in reading this report:

- Different flows are subject to a wide variety of differing factors that influence growth, and it is extremely difficult to find a control flow that gives a true reflection of growth without the existence of open access operators.
- Other factors that may explain demand growth, such as employment or population changes are not controlled for in this analysis.
- The use of a series of control flows to create an average mitigates for some of the issues with using control flows.
- The single flows identified for the Short Distance London and Non-London markets are only of limited relevance as a comparator for the selected open access flows; other control flows were considered, but appeared even less appropriate.

2. Passenger flows

2.1 The economic appraisal of the impact of the entry of open access operators requires an understanding of how demand has grown for each Case Study, and how demand could have expected to grow if open access operators had not entered the market. This comparison is undertaken by comparing the demand growth since the introduction of the open access services with the demand growth seen on the relevant control flow.

2.2 The demand growth presented here focusses on the growth for the last full year prior to the open access operator entering the market and the year during which the build-up of demand growth has been judged to have settled down. It is important to note that this section considers demand growth, and this is not necessarily reflective of revenue growth, as revenue growth is also influenced by changes in average fares and different mixes of ticket types and journey purposes, especially in competing markets. Additional comparisons based on revenue could have been presented, but this would have resulted in a significant increase in the number of figures presented.

2.3 The purpose of this section is to set out the demand growth seen on each of the case study flows and to test the hypothesis that the presence of open access Operators has resulted in demand growing at a higher rate than would otherwise have been expected. Demand growth is an important part of economic appraisal, and it is therefore important to understand the level of growth that can be attributed to the introduction of open access services.

Hull to London route

2.4 Hull Trains introduced direct services between Hull and London from September 2000, prior to this there was only one direct service per day between Hull and London. The new services resulted in more frequent direct journeys between Hull and London, and new direct journeys between stations such as Selby and London. These services also increased the number of services provided between Doncaster and London.

2.5 The demand growth for Long Distance London flows compared to the control flow are presented in Figure 2.1. Hull and Selby to London have seen growth far in excess of that seen on the control flow over the period 2000 to 2009. Although the limitations of the control flow approach have been set out earlier in this report, it is

clear that the growth on these flows is far in excess of that seen on flows which have not experienced such a change in service provision.

2.6 This growth is much more significant on the Selby to London flow which is starting from a much lower based and where the new direct services result in significant journey time reductions. The demand increase on Selby to London is also likely to include some switching of demand from other flows, where driving to other stations was a much more attractive option than changing trains. Hull to London represents the impact of more direct services, but with little change in actual journey times.

2.7 Demand growth for Doncaster to London, where the open access services simply have the impact of slightly increasing the number of direct services, is actually lower than the control flow. Other factors may be driving this lower growth, but given the limitations of the control flow approach, the demand changes are close enough that we conclude that there is no evidence here that the open access service has increased overall demand on this flow.

Figure 2.1 Demand Growth on Long Distance London Flows on Hull to London Route, 2000 to 2009

Source: LENNON and MOIRA Data supplied to ORR

2.8 The demand growth for Grantham to London, illustrated in Figure 2.2, shows stronger growth than on the control flow over the period. Grantham to London was previously served by a direct service, the impact of the open access operator being simply to increase the frequency of services and provide additional capacity. As we have noted, the control flow is based on a single flow, meaning it is difficult to draw robust conclusions that the presence of open access operators has had a significant impact on demand.

Figure 2.2 Demand Growth between Grantham and London, 2000 to 2009

Source: LENNON and MOIRA Data supplied to ORR

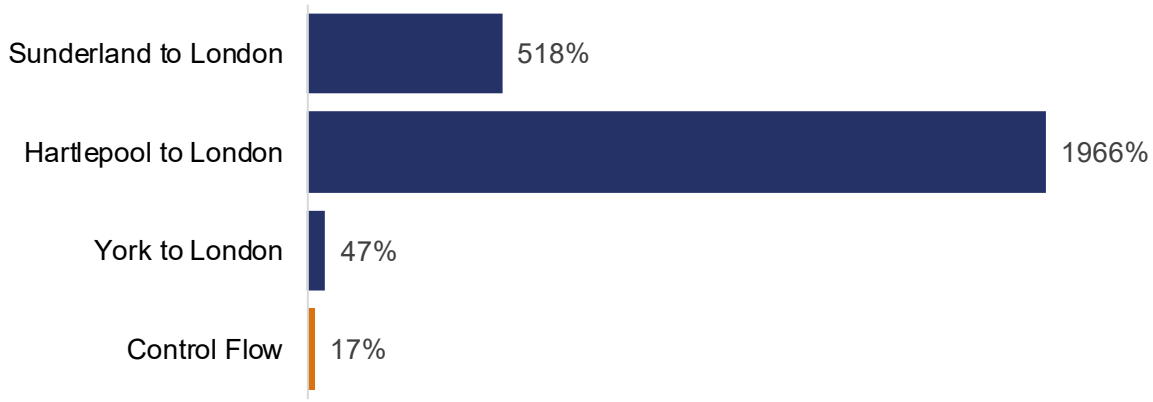
Sunderland to London route:

2.9 Grand Central introduced direct services between Sunderland and London from December 2007. These services resulted in new direct journeys to London being possible, including from Sunderland and Hartlepool, and increased the number of services provided between York and London.

2.10 Analysis of demand growth on the route between 2007 and 2016 is shown in Figure 2.1. The flows with new direct connections to London have seen significant demand growth over the period, and demand growth between York and London is also higher than the control flow, although given the limitations of the control flow approach it is difficult to draw firm conclusions for this flow.

2.11 Sunderland and Hartlepool have both started from a low base, and the growth represents significant improvements in service provision and likely also some demand switching from driving to other stations. Even with the limitations of the control flow approach, it is evident the demand on these flows has increased at a rate far greater than could be expected without the presence of open access Operators. Hartlepool to London has seen significantly higher growth than Sunderland to London, due to the more significant journey time savings and the fact that no direct service existed previously.

Figure 2.3 Demand Growth on Long Distance London Flows on Sunderland to London Route, 2007 to 2016



Source: LENNON and MOIRA Data supplied to ORR

2.12 The Grand Central service also introduced new direct journey opportunities into York, with growth from Hartlepool to York shown in Figure 2.4. The growth of 723% seen on this flow is again significantly higher than the control flow, giving clear evidence of a strong impact on demand despite only a single flow being used as the control flow, but starting from a very low base. There is a significantly better service offer with the open access services and this demonstrates that the demand growth from new journey opportunities is not just limited to the London flows.

Figure 2.4 Demand Growth between Hartlepool and York, 2007 to 2016

Source: LENNON and MOIRA Data supplied to ORR

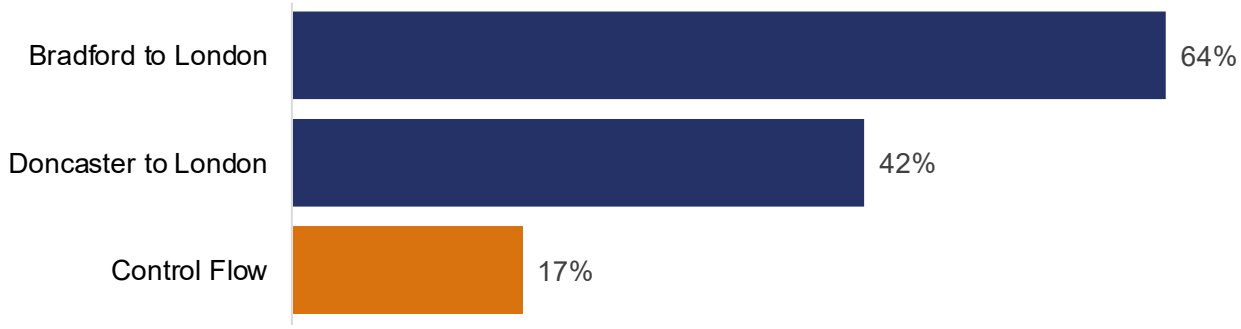
Bradford to London route

2.13 Grand Central introduced direct services between Bradford Interchange and London from May 2010. These services resulted in more direct journeys to London being possible and increased the number of services provided between Doncaster and London. Note that the introduction of Grand Central services on

this flow results in three-way competition between franchised operators, Hull Trains and Grand Central between Doncaster and London.

2.14 Bradford did not have a regular service to London prior to the introduction of open access, but there are frequent local services to Leeds which has a frequent service. Doncaster has a frequent direct service to London. As a result, the demand growth is not as significant as seen on the other routes, but is still higher than the control flow, as shown in Figure 2.5. The rate of growth for Doncaster to London is more than twice the control flow, and for Bradford to London is almost four times the control flow. This demonstrates that, even with the limitations associated with the control flow approach, the demand growth is higher than would have been expected without the open access services.

Figure 2.5 Demand Growth on Long Distance London Flows on Bradford to London Route, 2010 to 2017



Source: LENNON and MOIRA Data supplied to ORR

2.15 The open access operator offers a direct service between Bradford and Doncaster, however, this typically is slower than using franchised operators with an interchange at Leeds; it is also less frequent. Hence, the difference between the demand growth for Bradford to Doncaster and the control flow is much less noticeable, and it is difficult to draw conclusions on the impact of open access Operators given the limitations of the single control flow used. The more local nature of this flow means it is less likely to respond to the quantum of direct services being provided, as a more regular service is likely to be required to make a difference.

Figure 2.6 Demand Growth between Bradford and Doncaster, 2010 to 2017

Source: LENNON and MOIRA Data supplied to ORR

Conclusions

2.16 The analysis of demand changes presented in this section highlight that on flows which previous did not have a regular direct service, there have been significant demand changes that must be considered in the appraisal. The demand growth is less clear on other flows, and it is difficult to draw firm conclusions on these flows using the control flows.

2.17 It is therefore recommended that an alternative approach is used alongside the use of control flows in order to present a more robust appraisal of open access operators.

3. Fare levels

3.1 The complicated nature of rail fares in the UK market means that it is not simply possible to compare the fares charged at different times. Instead, our analysis has focussed on the average yield for each flow, that is the total revenue divided by the total number of journeys. This is a proxy for the average fare.

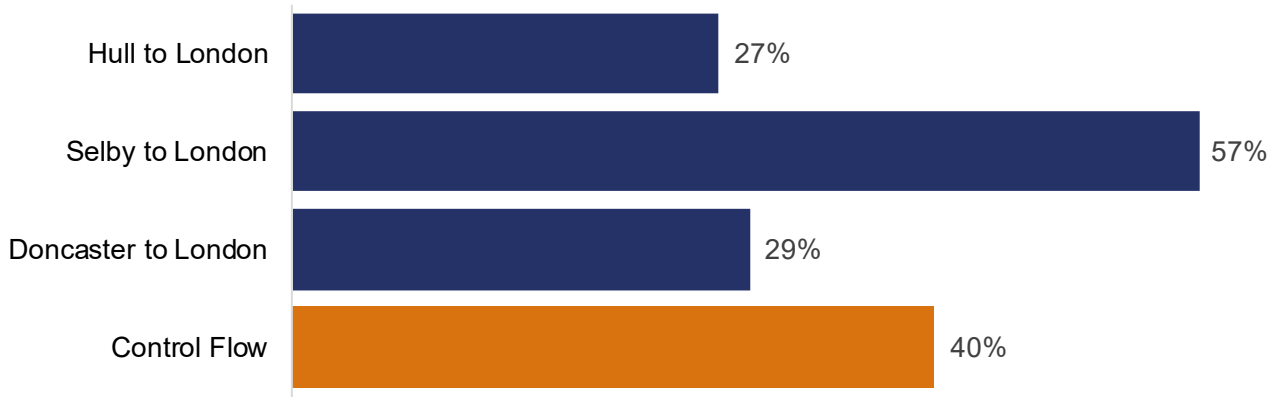
3.2 It is important to note that average yields are impacted both by changes in fares but also by changes in the ticket types purchased and the time of day people travel. Therefore, some of the movements in fares outline in this section may be a result of changes in those factors. A lower yield does not necessarily mean a lower fare if more people are travelling on advance tickets or travelling outside of the peak times. However, this is the most appropriate measure of average fare that can be easily applied in our analysis.

3.3 The hypothesis being tested in this section is that the presence of open access operators results in passengers paying lower fares than they otherwise would have done. It is important to understand the impact on fares, as significant benefits can be associated with passengers paying less fares.

Hull to London route

3.4 The average yield changes for the Long Distance London flows on this route show a mixed picture when compared to the average yields changes for the control flow in Figure 3.1. The flow where the open access operator represents a significantly better service offering than franchise operators, Selby to London, has seen higher average yield increases than the control flow. On the other flows, where there is more direct competition, average yields grew at a lower rate than the control flow.

Figure 3.1 Average Yield Growth on Long Distance London Flows on Hull to London Route, 2000 to 2009



Source: LENNON and MOIRA Data supplied to ORR

3.5 The Grantham to London flow, where the open access and franchised operators are in direct competition, has also seen average yields grow at a lower rate than the control flow.

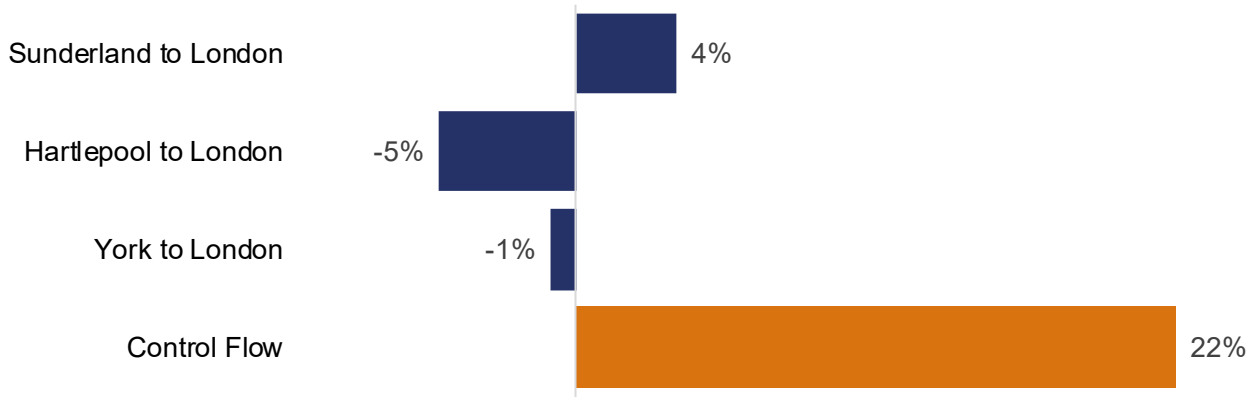
Figure 3.2 Average Yield Growth on Grantham to London flow, 2000 to 2009

Source: LENNON and MOIRA Data supplied to ORR

Sunderland to London route

3.6 The changes in average yield on the Long Distance London flows on the Sunderland to London route, compared to the control flow, are shown in Figure 3.3. The only flow where average yield increased over the initial period of services is Sunderland to London, with competition on all flows keeping average yields lower than they would otherwise be expected to be.

Figure 3.3 Average Yield Growth on Long Distance London Flows on Sunderland to London Route, 2007 to 2016



Source: LENNON and MOIRA Data supplied to ORR

3.7 While the average yields for Hartlepool to York, see Figure 3.4, have grown at a lower rate than the control flow, the difference is not significant enough to draw any conclusions about the impact of competition on fares. Changes in the mix of ticket types and timing of journeys could well be driving differences of the scale being seen. Average yields on this flow are extremely low, and demand levels are small, meaning it is unlikely to be the focus of any competitive action.

Figure 3.4 Average Yield Growth on Hartlepool to York flow, 2007 to 2016

Source: LENNON and MOIRA Data supplied to ORR

Bradford to London route

3.8 Figure 3.5 shows that in the period under review from 2010 to 2017, average yields for both Bradford and Doncaster to London decreased compared to a 7% increase for the control flow. On both flows franchised operators provide direct services (although only occasionally on Bradford), and on Doncaster to London there is also a Hull Trains service, suggesting that the competition has resulted in reductions in average yields, and therefore the fares, on these routes.

Figure 3.5 Average Yield Growth on Long Distance London Flows on Bradford to London Route, 2010 to 2017

Source: LENNON and MOIRA Data supplied to ORR

3.9 The comparison of average yield growth for Bradford to Doncaster with the control flow, shown in Figure 3.6, shows that changes on the two are very similar. This implies that the competition provided on this route has had no impact on the fares being charged, and this is expected as this flow is not one that is going to be a priority due to low yields and low demand levels.

Figure 3.6 Average Yield Growth on Bradford to Doncaster flow, 2010 to 2017

Source: LENNON and MOIRA Data supplied to ORR

Conclusions

3.10 The evidence presented in this section has suggested that there is some indication that fares might be lower in the presence of open access operators than they might otherwise have been. However, it is difficult to draw firm conclusions from the control flows, and it is also recognised that factors other than fare changes are driving average yields. It is therefore recommended that the benefits to users resulting from paying lower fares are not included within the appraisal.

4. Journey times

4.1 The separate elements of a journey which are impacted by the provision of a new direct service are considered for each of the flows. The following are therefore presented to aid understanding of how travel time has changes:

- The average in-vehicle journey time, the time spent travelling on rail services.
- The average number of interchanges made on journeys.
- The wait time estimate between services, which is related to the frequency of the services and not the time people spend waiting on platforms. This represents the inconvenience of infrequent services.

4.2 All journey time estimates are provided by running the timetable through industry standard software and calculating the average times for all passengers. Economic appraisal uses a valuation of the different elements of journey time, considering how much weighting passengers put on each element.

4.3 The purpose of this section is to highlight the journey time changes that will be used to calculate user time benefits in the appraisal, and to ensure that these inputs to the appraisal can be explained by the changes in service provision that have occurred.

Hull to London route

4.4 The journey time changes for Long Distance London services are presented in Table 4.1. Direct services previously existed between Hull and London, but it can be seen that the average number of interchanges has drastically reduced. For Selby to London, previously everybody had to interchange but now everybody travels direct, with passengers also saving on average 37 minutes of journey time. For both Hull and Selby, wait times have increased as direct services are less frequent than the options involving an interchange.

4.5 Doncaster to London is served by a frequent direct franchised service, and so the impact of the open access services is simply to increase the frequency of the services, and hence reduce passengers wait times. There is no noticeable impact on journey time, showing that the open access operator is not offering a journey time improvement compared to the franchised operators.

Table 4.1 Journey Time Changes on Long Distance London Flows on Hull to London Route, 2000 to 2009

Flow	Year	Journey Time	Interchanges	Wait Time
Hull to London	2000	169	0.7	91
	2009	161	0.1	105
Selby to London	2000	160	1.0	79
	2009	123	0.0	119
Doncaster to London	2000	102	0.0	33
	2009	103	0.0	27

Source: MOIRA Data Supplied to ORR

4.6 The Grantham to London flow, like Doncaster to London, has a regular franchised operator service and so the main impact on journey times that can be seen in Table 4.2 is a reduction in the wait time, with no impact on journey times and all passengers using direct services.

Table 4.2 Journey Time Changes on Grantham to London Flow, 2000 to 2009

Flow	Year	Journey Time	Interchanges	Wait Time
Grantham to London	2000	71	0	49
	2009	71	0	31

Source: MOIRA Data Supplied to ORR

Sunderland to London route

4.7 The impact of the open access Sunderland to London services on journey times on our selected flows, in Table 4.3, shows a mixed picture. The actual journey time for Sunderland to London is relatively unchanged, but the average number of interchanges reduces drastically. For Hartlepool to London, journey times reduced significantly, and average numbers of interchanges reduce to none from more than one. On both these flows, wait time has increased as the direct services operate less frequently than the indirect services. However, the indirect services are still an option, meaning that passengers can only benefit overall from the new service.

4.8 York to London has a regular franchised service, and so the impact of open access operator services is a slight reduction in the wait time, and there is also a

small journey time saving, but the latter could just be related to general changes that have happened on the route and it is difficult to attribute it directly to the open access services.

Table 4.3 Journey Time Changes on Long Distance London Flows on Sunderland to London Route, 2007 to 2016

Flow	Year	Journey Time	Interchanges	Wait Time
Sunderland to London	2007	221	1.0	47
	2016	216	0.2	118
Hartlepool to London	2007	251	1.1	121
	2016	189	0.0	172
York to London	2007	122	0.0	36
	2016	118	0.0	33

Source: MOIRA Data Supplied to ORR

4.9 Table 4.4 shows that the impact of the open access operator service on the Hartlepool to York flow, removing the interchange and providing a 17 minute reduction in journey time. However, as has been seen on other flows, the less frequent direct service sees an increase in wait time.

Table 4.4 Journey Time Changes on Hartlepool to York Flow, 2007 to 2016

Flow	Year	Journey Time	Interchanges	Wait Time
Hartlepool to York	2007	99	1	83
	2016	82	0	116

Source: MOIRA Data Supplied to ORR

Bradford to London route

4.10 The Bradford to London open access services result in an increased number of direct services for both Bradford and Doncaster to London, as seen in Table 4.5. The result is a reduction in the average number of interchanges, but an increase in the wait time for Bradford and simply a further reduction in the wait time for Doncaster to London on top of the reduction brought about with the introduction of

the Hull to London open access operator service. There is only a negligible impact on the journey time.

Table 4.5 Journey Time Changes on Long Distance London Flows on Bradford to London Route, 2010 to 2017

Flow	Year	Journey Time	Interchanges	Wait Time
Bradford to London	2010	172	0.8	62
	2017	175	0.5	69
Doncaster to London	2010	103	0.0	27
	2017	103	0.0	21

Source: MOIRA Data Supplied to ORR

4.11 Table 4.6 shows that the majority of passenger still interchange on journeys between Bradford and Doncaster, and the impact of the new service is to reduce the average wait times with no notable impact on journey times.

Table 4.6 Journey Time Changes on Bradford to Doncaster Flow, 2010 to 2017

Flow	Year	Journey Time	Interchanges	Wait Time
Bradford to Doncaster	2010	71	0.9	40
	2017	73	0.9	29

Source: MOIRA Data Supplied to ORR

Conclusions

4.12 The data presented here on the journey time estimates in the data set being used for this study suggests that the changes seen can be explained by the changes in service provision that have been made, and that the values are therefore appropriate for use in appraisal.

5. Economic impacts

Approach to economic appraisal

5.1 The purpose of an economic appraisal is to assess the benefits of an intervention and compare these with the costs of achieving it. It is done at the level of the UK economy, i.e. in general we are not interested in which parties win and lose, just the overall impact, but we have considered the relationship between benefits and costs from both a project and public sector funded point of view. The DfT's Transport Appraisal Guidance (TAG) sets out the process to be followed.

5.2 The principal benefits of open access competition are:

- Value of journey time savings (including interchange) combined with fares changes
- Environmental impacts – mainly emissions from cars that would have been otherwise used, offset by the emissions from diesel trains (we note that some open access trains are being replaced by bi-mode trains enabling them to use electric traction where this is provided; this will reduce CO_2 emissions, however as the appraisal is based on 2019 this has not been taken into account)
- Other impacts of less car traffic (accident savings, highway decongestion)
- Taxation impacts (less fuel duty).

5.3 The principal costs of open access competition are:

- Cost of providing the open access service (including staffing, rolling stock leasing and maintenance, track access, fuel)
- Less the additional revenue accruing to rail services.

5.4 There are different ways of reporting the economic impact of a transport scheme. Net Value is a simple way of understanding the overall impact of the scheme, by simply subtracting the total costs from the benefits. Another widely used measure is understanding whether the scheme delivers good value by comparing the benefits achieved with the costs required to achieve those benefits, the Benefit: Cost Ratio (BCR) simply divides the benefits by the costs.

5.5 However, there are different ways of looking at the BCR depending on what is defined as the benefits of the scheme and what are defined as the costs. We have calculated the BCR in two different ways:

- A Project BCR where the costs are direct costs or losses of revenue that occur (open access Operator costs, reduction in franchised revenue and reduction in tax paid on fuel for cars) and the benefits consist of open access revenue, user benefits and net impact on the environment
- A Public Sector BCR where the cost is the actual cost to the public sector (reduction in franchised revenue) and the benefits being the open access revenue less the open access costs, user benefits, reduction in tax paid on fuel for cars and net impact on the environment

5.6 It is worth commenting that even if the franchised operator is in the private sector, and taxpayer losses are mitigated in the short run, loss of revenue in the long run will translate into a public sector cost as it will be taken account of when the franchise is next let.

5.7 The appraisal was undertaken separately for the ten case study flows previously detailed. It should be noted that while benefits can be estimated at the flow level, the cost of serving a particular flow is not specific; in part because of this and also for confidentiality reasons we report results at a more aggregate level. A modelling approach was used for estimating the benefits and costs:

Modelling approach

5.8 The modelling approach is based on a standard choice model used in transport planning (called a Logit model). The basis for this model is that a “generalised cost” of travel is calculated as the fare paid plus the travel time multiplied by a value of time; travellers will be more likely to choose the option with the lower generalised cost, with a higher probability of choosing it if the cost difference is greater. The model is calibrated using the observed choice between open access and Franchise and gives an estimate of:

- Average Value of Time
- Inherent preference for open access operators (separately for London and non-London)
- Interchange Penalty (the additional hassle associated with having to change trains)

- Sensitivity to a change in Generalised Cost (Spread Parameter).

5.9 The model also estimates the change in the overall cost of travel (the composite cost). If this reduces when open access is introduced (as it will, as people have more choice), then there will be more overall travel. Forecasting the growth in overall rail travel is more difficult as we do not know reliably how many would have travelled without open access. Instead, we calibrate generation to a given generation: abstraction ratio (generated revenue divided by abstracted revenue). The study for ORR by Leigh Fisher in 2015 estimated the generation: abstraction ratio as a range, but we understand their central estimate was 0.32, and this has been used to derive the estimate of generated travel.

Appraisal results

5.10 The analysis was undertaken separately for each of the ten flows, but for confidentiality reasons we only present it here for the following types of flow:

- London case study flows with previous regular franchise service
- London case study flows without previous regular service
- Non-London case study flows
- We also present results scaled up to all open access services.

5.11 We present separately the benefits to travellers (whether or not they would have travelled in the absence of open access operators), environmental benefits (mainly less CO_2 emissions from cars, offset by those from diesel trains), and other benefits (mainly due to less highway traffic). On the cost side we present the Operator costs less change in national rail revenue.

Table 5.1 Benefits and costs of open access services (£m), – modelling approach (single year appraisal, based on rail year 2019)

Flow type	Benefit to rail travellers		Environmental Impact	Other net impacts	Operator costs	Change in national rail revenue	Net value	Project BCR	Public Sector BCR	Generation: Abstraction Ratio
London flows with regular franchise service	28.54		-0.17	2.92	-23.07	4.86	13.08	1.28	1.60	0.22
London flows without regular franchise service	30.04		-0.02	2.63	-17.33	7.07	22.39	1.74	2.92	0.60
Non-London flows	1.21		-0.01	0.04	-0.37	0.04	0.91	2.23	3.55	0.12
TOTAL OPEN ACCESS	**89.79**		**-0.40**	**7.73**	**-60.75**	**15.72**	**52.08**	**1.46**	**2.06**	**0.32**

5.12 The modelling approach gives a higher Public Sector BCR than the Project BCR. It should be remembered that implicitly this approach uses higher VoTs than those recommended in TAG.

5.13 The open access revenue for London flows with regular franchise services is the greatest, but these have low BCRs and generation: abstraction ratios. The London flows without regular franchise services have high generation: abstraction ratios and good BCRs. The non-London flows have much smaller revenue and very different results dependent on the approach; we have concerns about the figures for these flows, but it does look as if the BCR is good. Because of the size of these flows they make little contribution to the overall appraisal.

Sensitivity tests

5.14 To test the robustness of the appraisal we did the following sensitivity tests:

- If the open access services did not operate, the rail network would be less congested and there would hence be some reduction in delay; this is tested for both approaches.
- The calibration of the modelling approach to the Leigh Fisher study generation: abstraction ratio is uncertain, and we have tested the effect of calibrating to PDFH GJT elasticities instead – this only applies to the modelling approach.
- We have undertaken the modelling approach adjusting the VoTs for the modelling approach; this is only applied at the appraisal stage, not forecasting and is an approximate process but it does indicate the impact of different VoTs.

5.15 Table 5.2 shows the results of these for all open access services.

Table 5.2 Benefits and Costs of Open Access Services (£m) – Sensitivity Tests

Sensitivity Test	Benefit to rail travellers	Environmental Impact	Other net impacts	Operator costs	Change in national rail revenue	Net value	Project BCR	Public Sector BCR	Generation: Abstraction Ratio
Central Case	89.79	-0.40	7.73	-60.75	15.72	52.08	1.46	2.06	0.32
1 min better reliability without OA	88.84	-0.40	7.76	-60.75	15.72	51.17	1.45	2.04	0.32
GJT Elasticities	90.31	-0.40	7.50	-60.75	14.54	51.15	1.45	2.02	0.29
TAG VoTs	52.66	-0.40	7.73	-60.75	15.72	14.95	1.13	1.30	0.32

5.16 The key conclusions from the sensitivity tests can be summarised as:

- Taking into account that the presence of open access operator services impacts on reliability levels only has a small impact on the Net Value and BCRs.
- The alternative calibration of the Modelling Approach to published elasticities only has a small impact on the Net Value and BCRs.
- Applying TAG VoTs in the modelling approach does significantly reduce benefits. However, we must note that the adjustment to VoTs is an approximation and not strictly in line with economic theory.

6. Economic appraisal conclusions

6.1 Our analysis of the flows served by open access operators has indicated that there are three types of flows, each of which experiences a different impact as a result of the introduction of the new services:

- London flows which previously had a regular direct franchised service, and hence now have a high level of competition (London Regular).
- London flows which previously had either an infrequent or no direct franchised service (London Non-regular).
- Non-London flows (Non-London).

6.2 Comparison of the demand growth and journey time characteristics of these three types of flows reveals the following:

- London Regular Flows have evidence of stronger demand growth than has been seen on the control flows examined during the study, with some abstraction away from the franchised operators, the scale of which is dependent on the level of service provided by the franchised and open access operators. These flows see very little impact of the open access operator on journey times, with a slight improvement in wait time being the only noticeable impact.
- London Non-regular flows have seen extremely high levels of growth, an order of magnitude greater than the growth on the control flows. The open access operators have a significant proportion of the demand now travelling on these flows, with the franchised operator demand having reduced significantly in many cases. The impact on journey time on these flows is much more significant, with interchange penalties being reduced and in some cases improvement in journey time. The direct services operate less frequently than the options to interchange on franchised services, so wait times do increase.
- Non-London flows exhibit the same impact as the London flows, and again this depends on whether there is a regular franchised operator service, but the scale of these flows is small in comparison to the London flows.

6.3 The analysis presented suggests there may be some downward pressure on average yields, most noticeable when considered on the London Regular flows. However, changes in average yields are caused by other factor such as changes in journey purpose proportions, different first and standard class proportions, and more use of advanced tickets. Each of these may create an illusion of reducing fares. As the evidence is not conclusive, our appraisal of open access operations has assumed that there is no direct impact on fares.

6.4 Our appraisal of the benefits of open access operations to the UK economy suggest that the total net value is in the range of £15m to £52m. The project based BCR for open access operations is in the range 1.13 to 1.46, while the Public Sector based BCR is in the range 1.30 to 2.06. These results are based on our modelling approach, which shows that the presence of open access operators does bring a benefit to the UK economy. We should point out that the top of the range is based on values of time that are significantly higher than those in TAG, and hence an appraisal consistent with TAG would likely be closer to the bottom of the range.

6.5 Analysis of the breakdown of the impacts by the three types of flow, shows that the user benefits are much higher for the London Non-regular flows than the London Regular flows, demonstrating the benefit to those places that didn't previously have a regular direct service. This is important with the current levelling up agenda, as these benefits are being felt in areas which are lagging some way behind the rest of the UK.

6.6 The case for open access operators benefitting the economy is less clear on the flows served by a direct franchise operator service, and the net value in our central case to the economy is £13.08 million, considerably less than for London flows without regular franchised service. It is important to note that the size of open access operator revenue on these flows indicated that some revenue from flow such as York and Doncaster to London is essential for the viability of the service, and is therefore necessary to provide the benefit to other areas such as Hartlepool, Sunderland, Hull and Bradford.

6.7 It is important to recognise that open access operations are not the only solution to providing the benefits estimated in our analysis, but the benefit of these additional services is clear.