Assessing mark-ups for open access passenger services—defining market segments

—

Interim findings
13 November 2026

1 Introduction

The purpose of this study is to define market segments for open access passenger services, and to develop a methodological approach for setting mark-ups which includes an assessment of ability to pay consistent with the efficient operator test set out in Clause 64(3) of the Railways Bill.[1] The study will inform Network Rail's upcoming consultation and the future application of mark-ups to open access passenger services.

The study is split into four research areas:

- The policy rationale for applying mark-ups consistently to both current and prospective open access passenger services.
- A proposed framework for passenger rail market segmentation.
- A proposed approach to interpreting and applying the 'efficient operator' requirement set out in Clause 64(3).
- A proposed methodology for assessing ability to pay and determining future mark-up levels.

[1] House of Lords (2026), 'Railways Bill', HL Bill 63 (as amended in Grand Committee), 26 October, clause 64(3).

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This note outlines our interim findings on the first two research areas of this study.

We have focused on designing a structured approach to developing market segments from first principles—without necessarily relying on the approaches historically adopted in rail regulation in Great Britain (GB). Our emphasis has been on developing a methodological framework rather than undertaking quantitative analysis and modelling. However, we have identified areas where future analysis and data inputs will be required.

Finally, it is important to note that this report focuses solely on passenger services provided by Open Access Operators (OAOs). We do not consider arrangements for freight or for non-GBR publicly owned or contracted operators.[2]

2 Policy rationale for the application of mark-ups

As part of developing the framework, Network Rail commissioned Oxera to consider the scope for applying mark-ups under GBR, including whether both current and prospective open access passenger services should be treated consistently within a single mark-up framework.

To inform our assessment, we considered the rationale for applying mark-ups to rail services and reviewed relevant legislation. While we also considered the Office of Rail and Road's (ORR's) historical approach to the scope and application of mark-ups, we have not taken this to be a binding constraint. Rather, our assessment is based on economic first principles.

2.1 Rationale for mark-ups

Train services impose direct costs on infrastructure through wear and tear, which can be recovered through a variable track access charge. However, fixed or common costs, such as those of the signalling system, do not vary with network use in the short term and also need to be recovered. Public funding is expected to cover some of these costs, but

[2] We understand that Network Rail considers a lump-sum charge should apply for non-GBR publicly owned or contracted operators. See Network Rail (2026), 'Great British Railways Access and Use Policy', Consultation, September, p. 61. For the rationale for this, see Oxera (2026), 'Mark-up options to support fixed cost recovery under GBR', 6 March, section 4.9.

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users should also contribute where they are able to, to ensure the responsible use of public funds.[3] Therefore, the purpose of mark-ups is to contribute to the recovery of GBR's fixed infrastructure costs.

2.2 Legislative requirements for the scope of application of mark-ups

The Railways Bill establishes the conditions under which GBR may charge amounts above directly incurred costs, as well as the general duties GBR must consider when exercising its functions.

Specifically, GBR must make a scheme setting out the charges 'for access to and the use of GBR infrastructure for the operation of trains', and 'in relation to trains which are planned to use GBR infrastructure but do not operate, or do not operate in full'. Charges 'in relation to the operation of a train must be set at the cost that is directly incurred as a result of the operation of the train'. The charges scheme may also 'provide for a higher amount to be charged in particular circumstances provided that it does not exceed the amount that Great British Railways considers is the amount that an efficient operator would be able to pay in those circumstances'.[4]

The Railways Bill establishes that GBR can set charges for any trains using GBR's infrastructure, with the only explicit exemption relating to 'GBR passenger services'.[5] For setting charges above costs directly incurred, which includes mark-ups to recover fixed costs, the only condition is that an efficient operator would be able to pay the charge.

2.3 The ORR's historical scope of application of mark-ups

2.3.1 PR18

PR18 was the first time Infrastructure Cost Charges (ICCs) were introduced for passenger services to contribute towards the recovery of Network Rail's avoidable fixed costs.

The ORR's approach for setting ICCs has been governed by The Railways (Access, Management and Licensing of Railway Undertakings) Regulations 2016. It is based on a Market-can-Bear (MCB) test that is

[3] Any fixed costs not recovered through track access charges or other means (e.g. revenues from retail and commercial property rentals) are expected to be covered by public funding. For the details of such public funding for Network Rail historically, see Oxera (2026), 'Mark-up options to support fixed cost recovery under GBR', 6 March, pp. 7–8.
[4] House of Lords (2026), 'Railways Bill', HL Bill 63 (as amended in Grand Committee), 26 October, clause 64.
[5] House of Lords (2026), 'Railways Bill', HL Bill 63 (as amended in Grand Committee), 26 October, clause 64(5).

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used to identify segments able to bear an ICC.[6] In PR18, the ORR adopted two market segments for open access services: 'interurban' and 'other', with a non-zero ICC adopted for the interurban segment only.[7]

The ORR decided to grant relief from any increase in charges prompted by the introduction of ICCs for the whole of CP6 for existing OAOs. This was justified as follows.[8]

- OAOs operating services prior to CP6 were granted access based on the ORR's previous access policy, which restricted OAOs' use of the network as it was designed for relatively small-scale entry, using under-used capacity to serve new markets.
- Analysis commissioned by the ORR showed that existing OAOs had low net operating profits. Therefore, these services were unlikely to be able to bear increased charges.
- To protect the existing level of competition provided by these services.

The ORR determined this exemption before finalising the definition of an 'interurban' service. Once the definition was finalised, we understand that no 'existing' OAO services fell within the interurban segment and, even without the relief, would not have paid an ICC.[9]

2.3.2 PR23

In PR23, the ORR added an 'airport services' segment alongside the 'interurban' and 'other' segments.[10] The ORR also decided to put the relief policy it introduced in CP6 on hold for CP7. This was justified on the basis that the relief that was in place for 'existing' OAOs (as defined in PR18) would not impact the charges that these operators face in practice, since all the services approved before PR18 would continue to

[6] For a detailed overview of the ORR's approach, see Oxera (2026), 'Mark-up options to support fixed cost recovery under GBR', 6 March, section 2.
[7] Office of Rail and Road (2018), '2018 periodic review final determination: Supplementary document – Charges and incentives: Infrastructure cost charges conclusions', October, pp. 40–41.
[8] The ORR defined existing OAOs as operators of services who had access agreements approved before the ORR set out their intention to review the charges levied on OAOs as part of PR18. Office of Rail and Road (2018), '2018 periodic review final determination: Supplementary document – Charges and incentives: Infrastructure cost charges conclusions', October, pp. 33 and 40; Office of Rail and Road (2015), 'Competition in Passenger Rail Services in Great Britain', 26 November, p. 5.
[9] The definition was finalised in March 2019. It is our understanding that the 'existing' OAOs (Hull Trains and Grand Central) did not operate services meeting the thresholds of the interurban definition. See Office of Rail and Road (2019), 'Open access infrastructure cost charge implementation: Conclusions document', 21 March; Office of Rail and Road (2022), 'PR23 – Review of Network Rail's access charges: Technical consultation—Further proposals', 14 April, footnote 35.
[10] Office of Rail and Road (2023), 'PR23 final determination: Policy position – access charges', 31 October, pp. 18 and 29.

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fall outside of the interurban market segment (that the ORR considered could bear an ICC).[11]

The ORR also recognised the need to:

- ensure that the charging scheme results in equivalent and non-discriminatory charges for all operators currently providing services in a similar market segment;
- consider the duty to have regard to Secretary of State funds, which is supported by allowing an ICC on services which can be shown to bear an ICC.

Following PR23, the ORR committed to engaging market participants on potential options for changes to the access charges framework for PR28. In September 2024, the ORR communicated its intention to review the justification for exemptions from ICC. While the ORR's review has since been superseded (following the decision to move towards GBR), it is important to note that, even prior to recent rail reforms, the ORR had discussed that the exemption was never guaranteed to continue indefinitely, that retaining it risked creating an asymmetric charging regime, and that operators should pay a mark-up where analysis supports one.[12]

2.4 Application of the mark-ups framework to current and prospective open access passenger services

As set out in section 2.2 above, the Railways Bill provides GBR the ability to set charges for all non-GBR operators that make use of GBR infrastructure. GBR's decision on whether to apply a single mark-up framework to both current and prospective open access passenger services should be based on first-principles, taking into account the following essential economic considerations.

1 **Cost recovery:** As set out in section 2.1, mark-ups are intended to contribute to the recovery of GBR's fixed infrastructure costs, reducing the amount that must be met from public funds. This supports GBR's duty to exercise its functions while taking into account the costs that will need to be met from public funds.[13]

[11] Office of Rail and Road (2022), 'PR23 – Review of Network Rail's access charges: Conclusions on charging framework', 20 October, pp. 10–11; Office of Rail and Road (2022), 'PR23 – Review of Network Rail's access charges: Technical consultation—Further proposals', 14 April, pp. 30–31.
[12] For the full set of the ORR's reasons for removing or retaining the exemption, see Office of Rail and Road (2024), 'ORR workshop on access charges framework: Engagement with passenger operators', 9 September.
[13] House of Lords (2026), 'Railways Bill', HL Bill 63 (as amended in Grand Committee), 26 October, clause 18(2).

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2 **Avoidance of distortions:** Mark-ups should be levied in a way that minimises market distortions. This includes limiting any contraction in service provision and avoiding competitive distortions by treating operators undertaking comparable activities equally.

There is a strong case for applying a single mark-up framework to both current and prospective open access passengers, based on both of these considerations.

First, applying the mark-ups framework to both current and prospective open access passenger services ensures that services able to pay a mark-up contribute to the recovery of GBR's fixed infrastructure costs. Inclusion within the framework should not, however, be confused with an automatic obligation to pay a mark-up. Whether a mark-up is charged, and at what level, should be determined through a robust assessment of ability to pay, including the application of the efficient operator test. This ensures that operators providing services efficiently are not excluded from the market, thereby minimising distortions to the overall level of activity.[14]

Second, applying the framework to both current and prospective open access passenger services reduces the risk that operators undertaking comparable activities are treated differently solely because they entered the market at different times.[15] In contrast, exempting a subset of operators risks undermining the level playing field between OAOs.

We recognise that the ORR previously granted relief to existing OAOs on the basis that they had obtained capacity under an access policy designed to facilitate relatively small-scale entry, using under-used capacity to serve new markets (see section 2.3.1). However, this does not provide a sound basis for excluding those OAOs from GBR's mark-ups in perpetuity. Under the proposed framework, the ability-to-pay assessment would determine whether a mark-up is appropriate and at

[14] Mark-ups may be assessed at the market-segment level, considering a representative 'efficient' operator in a given segment. This preserves incentives for operators to improve efficiency (or, conversely, avoids rewarding operators that are less efficient with lower mark-ups).
[15] This does not preclude the phase-in of mark-ups for new OAOs to reduce barriers to entry. This may be considered less distortive as time-limited phase-in mechanisms within the framework can provide new operators with sufficient time to establish their operations and reach an efficient scale, comparable to that of existing operators. In contrast, there is less likely to be a clear economic rationale for exemptions or adjustments for existing OAOs who are already established.

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what level. Granting an exemption before that assessment risks distorting market outcomes as set out above.

The PR18 experience also suggests that the exemption was in practice irrelevant. This is because once the ORR finalised the definition of the 'interurban' segment, no services operated by existing OAOs fell within it. Those services would therefore not have paid an ICC even without the relief. Indeed, during PR23 the ORR put its relief policy on hold for CP7 for this reason, and emphasised the importance of equivalent, non-discriminatory charges for operators in similar market segments, and of allowing ICCs where services could be shown to bear them. The experience therefore supports assessing services under a common framework rather than relying on an exemption.

We therefore recommend that the framework applies to all open access passenger services, while allowing the level of any mark-up—including a zero mark-up if/where appropriate—to reflect the evidence for the relevant market segment.

3 Segmentation of the passenger rail market

In this section we set out options for the segmentation of the passenger rail market for the purpose of levying mark-ups. The options are based on an assessment of passenger rail market characteristics from first principles, while also drawing on domestic and international precedent. Using passenger rail market characteristics, we propose four high-level options for the segmentation. These are then evaluated, drawing on a set of principles for segmentation agreed with Network Rail, to arrive at our recommended approach.

3.1 Principles for the design and evaluation of segmentation options

Market segments provide the basis for assessing the ability of open access passenger services to pay a mark-up. The definition of market segments should support mark-ups that do not create undue discrimination, distortion of competition, or other unintended consequences. In addition, the segments need to be clearly identifiable so that all services can be allocated clearly to one segment, and stable over time in order to facilitate a robust assessment of the ability to pay.

The following set of principles have been agreed with Network Rail and used to inform the design and evaluation of options for market

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segmentation.[16] The principles have been grouped into three categories to reflect the different requirements a segmentation approach should satisfy. These are:

1. **Legal and structural principles**: these principles set the requirements that any approach must meet, and ensure that the proposed categories form a coherent framework that is consistent with legislation.
2. **Implementation principles**: these principles assess whether the definitions can be applied clearly and consistently using available systems and data, and without creating unnecessary complexity.
3. **Economic principles**: these principles focus on whether the segments are likely to reflect materially different abilities to pay a mark-up, while avoiding distortions.

Table 3.1 Principles for segmentation

#	Principle	Description
Legal and structural principles		
1	**Legal requirements**	Consistent with legal requirements set out in the Railways Bill and any other applicable legislation (e.g. subsidy control).
2	**Mutually exclusive & collectively exhaustive**	Segments should cover all types of open access passenger services, and each service should only be covered by a single segment.
3	**Non-discriminatory**	Comparable services are in the same segment. Services are allocated to segments based on objective criteria.
Implementation principles		
4	**Transparent and practical definitions**	Segment definitions, thresholds, and allocation rules should be understandable, reproducible, and supported by a clear rationale. Operators should be able to identify their segment in advance.

[16] These principles are consistent with the 'design principles of ancillary charges' set out in the GBR Access and Use Policy (AUP) consultation. Network Rail (2026), 'Great British Railways Access and Use Policy', Consultation, September, pp. 60–61.

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#	Principle	Description
5	**Non-discretionary**	Segment definitions should be clear cut, and not depend on discretionary, case-by-case judgement.
6	**Supported by sufficient data**	There must be data available to classify services and to undertake ability to pay analysis. Where characteristics cannot be observed directly, robust proxies may be used.
7	**Proportionality**	Segmentation should be no more granular or complex than necessary to identify segments with distinct abilities to pay.
8	**Stable over time**	Segment definitions should remain broadly stable over time to facilitate long-term planning and investment.
Economic principles		
9	**Materially different abilities to pay**	Segments identify genuinely distinct abilities to pay a mark-up, rather than being distinct only in a nominal or operational sense.
10	**Avoids material distortions**	The segmentation should not distort competition between otherwise comparable services, discourage efficient entry or exclude efficient services that can cover their directly incurred costs.
11	**Avoids gaming and perverse incentives**	Definitions should not encourage operators to alter service characteristics such as stopping patterns, frequencies, timetabling, rolling stock, or capacity requests simply to fall within a segment subject to a lower mark-up.

3.2 Long list of passenger rail market characteristics

To develop segmentation options, we first identify passenger rail market characteristics that could, in principle, reflect differences in services' ability to pay a mark-up. These characteristics cover demand-side factors, which reflect the markets served and passengers' willingness to pay, and supply-side factors, which reflect services' operating models and cost structures. Together, demand- and supply-side factors determine ability to pay: high passenger willingness to pay may support higher margins on a route, but strong competition or a high cost base is likely to erode them. Table 3.2 summarises the characteristics considered and gives examples of how they could inform segmentation.

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Table 3.2 Potential characteristics to inform segmentation

	Characteristic	Examples
1	**Service type and geographic market**	Urban, regional, suburban, rural, interurban, long-distance commuter, intercity.
2	**Distance and journey duration**	Short-, medium- and long-distance services (based on mileage or journey duration).
3	**Station usage and market size**	Services linking heavily used stations versus services serving smaller stations.
4	**London vs non-London**	Services calling at London stations.
5	**Journey purpose and passenger demand profile**	Business, commuting leisure, and other travel. Potentially proxied by ticket type (season/off peak).
6	**Time of day and day of week**	Peak vs off peak, weekday vs weekend, or specific high-demand periods (Sunday afternoons, bank holidays).
7	**Stopping pattern and speed**	Non-stop, limited stop, and stopping services. High-speed/fast/slower services.
8	**Rail and intermodal competition**	Group services according to competition from other rail operators and other modes (car, bus, air).
9	**Service quality and passenger proposition**	Journey time, comfort, connectivity, frequency.
10	**Rolling stock, capacity, and traction**	Rolling stock type, seating capacity, seat density, train length, diesel vs electric traction.
11	**Network and infrastructure context**	Metropolitan nodes, major stations, (un-)congested areas, number of tracks, max line speeds.
12	**Capacity allocation and path availability**	Planned services vs services using residual or ad hoc or otherwise underutilised capacity.
13	**Operating model and cost structures**	Services with standard operating models and cost structures versus services with distinct operating models and cost structures (e.g. international, night, seasonal, heritage, and charter services).
14	**Empty trains**	Empty coaching stock movements.

Table 3.2 shows that there are many characteristics and combinations that could be considered. A highly detailed framework is therefore possible, but this involves trade-offs. Specifically:

- using fewer characteristics is more practical, but risks grouping services with materially different abilities to pay together,

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potentially leading to mark-ups that are too high for some and too low for others.
- a more granular approach may distinguish between these services more accurately. However, this requires more data and analysis, which may be disproportionate if the additional characteristics do not materially improve segmentation, and could also risk spurious accuracy.[17]

Therefore, additional characteristics should be included in the segmentation approach only where they help identify segments with materially different abilities to pay, to an extent that justifies the additional complexity.

3.3 Segmentation options

Using the long-list of characteristics presented in Table 3.2, we developed four options for segmenting the passenger rail market. These options are based on an initial assessment of combinations of characteristics against the principles set out in section 3.1.

- **Option 1: segments based on market size**—this approach groups services according to the size of the markets they serve.
- **Option 2: segments based on journey purpose**—this approach groups services according to passenger journey purpose as inferred from ticket-type proxies.
- **Option 3: segments based on specific corridors**—this approach groups services by corridors with similar market conditions.
- **Option 4: segments based on operating models**—this approach groups services according to the operating model of the service.

Each of these options has a different starting point: market size, journey purpose, corridor, or the operating model. However, it is possible to supplement this further using additional characteristics to create sub-segments.

For each option, segmentation is conducted at the service-code level, as this is the most granular unit for revenue analysis and billing. Box 3.1 provides more detail on service codes.

[17] Spurious accuracy could be an issue insofar as a very granular level of segmentation risks leaving very few operators (potentially a single one) within the segment.

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Box 3.1 Service codes

Service codes are defined for each operator and typically comprise a group of services running between an origin and a destination in both directions, including calls at intermediate stations.[1]

Service codes do not generally distinguish between peak and off-peak services.

Service codes are the lowest level at which passenger operators can currently be billed by Network Rail. Revenue data is also currently collected at the service-code level. Therefore, service codes (rather than individual services) will be assigned to market segments.

Note: [1] We understand that calling patterns can vary slightly within a service code but usually fast/slow and different routes between an origin and destination would be assigned different service codes.
Source: Information provided by Network Rail; Office of Rail and Road (2018), '2018 periodic review draft determination: Supplementary document – Charges and incentives: Infrastructure cost charges consultation', June, p. 31; Steer (2022), 'PR23 Charges Review Market Can Bear Analysis – Passenger services', April, p. 10.

In addition to the four primary options evaluated in this section, we also reviewed two existing approaches to passenger rail market segmentation used in other contexts: the Competition and Markets Authority's (CMA) 2018 rail franchise merger guidance and the Passenger Demand Forecasting Handbook's (PDFH) approach to market segmentation. However, neither approach was taken forward as a standalone option. This is because both approaches are applied to individual passenger flows rather to entire services.[18] This is discussed further in Annex A1.

[18] For example, a service calling at London, Coventry, and Birmingham carries three passenger flows: London–Coventry, London–Birmingham and Coventry–Birmingham. However, mark-ups are charged to services, not passengers, so a flow-based approach would not align with this framework.

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The remainder of this section presents each of the four main options considered, as well as providing illustrative examples of potential resulting segmentations. We then evaluate each option, considering the principles set out in section 3.1, before identifying a preferred approach.

3.3.1 Option 1: segments based on market size

The primary basis for this option is to distinguish between services connecting major markets from services serving smaller or more local markets. This is because services connecting major markets may:

- have higher passenger demand, enabling them to carry more passengers per service and giving operators greater scope to cover fixed operating costs;
- be more likely to support higher fares, as a greater proportion of passengers may have a higher willingness to pay.[19]

The implementation of this approach relies on observable metrics of market size. These could include thresholds based on variables such as station usage, population size, or other indicators of economic activity.[20]

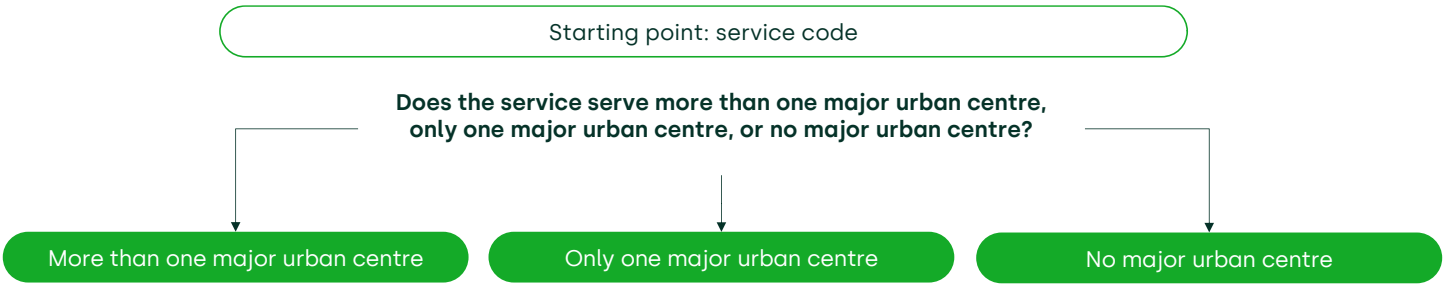
It should be noted, however, that whilst in principle we would expect services that connect large markets to have a higher ability to pay a mark-up, in practice there are multiple factors which could affect this. For example, services connecting major markets may face strong competition, while smaller markets may have fewer alternatives and more captive passengers. Therefore, further distinctions or sub-segmentation may be necessary.

Figure 3.1 presents an illustrative example of a market-size based segmentation.

[19] For example, larger markets are likely to have a greater proportion of business and commuter passengers who are likely to have a higher willingness to pay.
[20] We note that the ORR's current approach is most similar to this option, as it combines thresholds for station usage with a distance threshold to distinguish between services that connect to major markets (interurban services) and other services. Office of Rail and Road (2023), 'PR23 final determination: Policy position – access charges', 31 October, p. 17.

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Figure 3.1 Segments based on market size—illustrative example



Note: The figure presents only the primary segmentation, additional sub-segments based on other characteristics may be necessary.
Source: Oxera.

Depending on how exactly it is implemented, the approach above could generate several combinations of segments based on the concept of a 'major urban centre'. The variables and thresholds used to define these would therefore need to be chosen carefully to avoid assigning broadly similar services to different segments because of marginal differences between them: for example, there may be a 'cliff edge' when services serving urban centres of only slightly different sizes face substantially different mark-ups.

One way to reduce this risk is to take a more gradual approach, using more segments so that the difference in mark-up between each segment is smaller. For example, this could involve using bands based on the distribution of the variable in question (e.g. station entries and exits), rather than a single numerical threshold. However, this could make the framework more complex or imply a level of precision that the evidence does not support. This may be a particular concern when assessing an efficient operator's ability to pay. The merits of a more gradual approach should therefore be considered in the context of the wider framework and how severe any 'cliff edges' are likely to be under a simpler approach.

3.3.2 Option 2: segments based on journey purpose

Option 2 segments the market by passenger journey purpose, which may indicate passenger price sensitivity and willingness to pay. For example, if business travellers and commuters are less price sensitive than leisure travellers, operators may be better able to charge them

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higher fares. Services catering to these passengers may therefore have a greater ability to pay a mark-up, all else being equal.[21]

However, passenger journey purpose is not directly observable. Instead, the types of tickets purchased by passengers of a given service are likely the best, albeit imperfect proxy available. For example, season tickets holders are more likely to be commuters and may be less price sensitive, whereas advance or off-peak tickets may indicate leisure travel that can be seen as more price sensitive.

However, these are hypotheses that would need to be tested as they rely on a number of assumptions. In order to implement this option, open access passenger services would need to be grouped by whether they have a dominant share of a particular ticket type, above a defined threshold. This would mean that a service with a high share of season ticket revenue (e.g. above 50%) would be placed in the 'commuter' segment, even though it carries a mix of different passenger types. It may therefore be difficult to assign services clearly to a dominant demand category.

Figure 3.2 Segments based on journey purpose—illustrative example



Note: The figure only presents the primary segmentation, additional sub-segments based on other characteristics may be necessary.
Source: Oxera.

3.3.3 Option 3: segments based on specific corridors

The third option groups services by the major rail corridors they serve, thereby reflecting the associated broad commercial market conditions on those corridors. These corridors would be defined in advance, such

[21] The impacts of competition would also need to be considered.

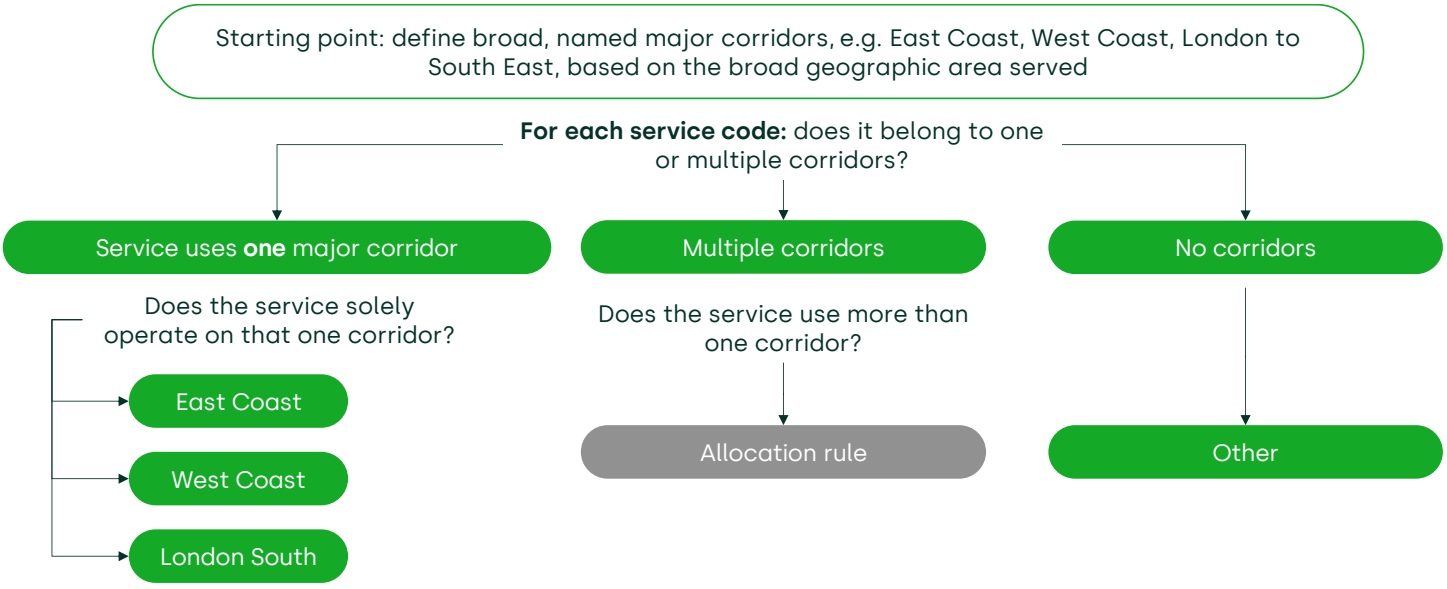
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as the East Coast Main Line, West Coast Main Line and London–South East markets, and could span multiple railway lines.[22]

The corridors would therefore reflect several aspects of the commercial markets they serve which may influence ability to pay, including the cities served, infrastructure, rail competition, and alternative transport options.[23]

However, in order to implement this option in the GB context, clear rules would be needed to assign services to specific corridors. These rules would need to specify the unit of allocation (whether it is based on principal market served on that corridor, by route section travelled or by passenger origin and destination), and how to treat services that use multiple corridors or extend beyond a major corridor. Services that do not use a major corridor would also need to be grouped into an 'Other' category.

Figure 3.3 Segments based on specific corridors—illustrative example



Note: The figure only presents the primary segmentation, additional sub-segments based on other characteristics may be necessary.

[22] The choice and definition of major corridors is a major design consideration. A more detailed design based on multiple different corridors can add granularity, but also complexity.
[23] The latter two factors are relevant because the availability of alternatives affects how strongly an operator is constrained when it comes to raising fares.

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Source: Oxera.

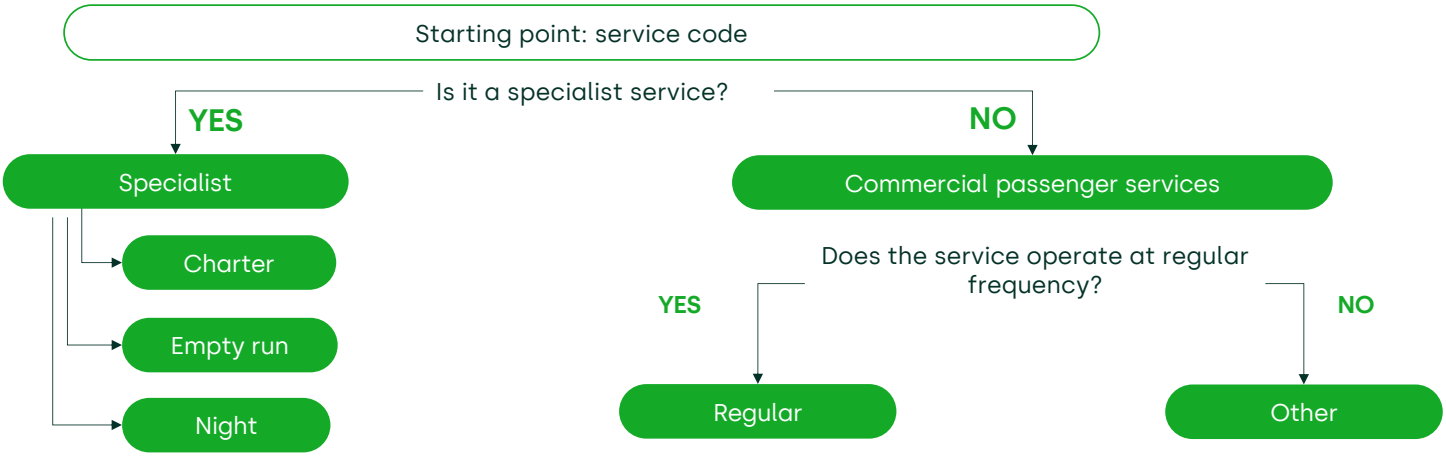
3.3.4 Option 4: segments based on operating models

As noted earlier, both demand- and supply-side factors may be relevant to driving different abilities to pay a mark-up. Option 4 defines segments according to the service's operating model. This is because different service types may have different underlying cost structures and associated demand profiles, which could affect their ability to pay a mark-up.

The starting point is therefore to group services together that share the distinctive characteristics relating to their operating model. This could distinguish 'specialist services', such as charter services, empty movements, and night trains from the bulk of more regular passenger services.

The remaining non-specialist commercial passenger services could then be further segmented using observable operating characteristics, such as frequency, speed, capacity, rolling stock and network integration, irrespective of the service's route or location. However, clear criteria and a hierarchy would be needed to assign services to distinct categories, along with a residual category for services that do not meet the criteria for the other segments.

Figure 3.4 Segments based on operating models—illustrative example



Note: The figure only presents the primary segmentation, additional sub-segments based on other characteristics may be necessary.
Source: Oxera.

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3.3.5 Evaluation of options

This section summarises the strength and limitations of each option and compares them by taking into account the set of principles identified in section 3.1. Table 3.3 below provides a summary of the evaluation.

Option 1: segments based on market size

Market size is likely a key driver of ability to pay, as major markets are likely to attract more passengers and support higher fares. It is practical to observe and measure using objective, readily available metrics such as station usage and population size.

However, segments would need to be defined using clear, data-supported market-size thresholds. In addition, market size on its own does not reflect other drivers of ability to pay, such as service operating models.

Overall, this option performs well against most principles but requires further refinement to define segment boundaries robustly and account for other relevant drivers of ability to pay.

Option 2: segments based on journey purpose

Journey purpose affects passengers' price sensitivity and willingness to pay, which likely influences a service's ability to pay a mark-up through the fares that can be charged. However, journey purpose is not directly observable, so ticket type would serve only as an imperfect proxy. This would require simplifying assumptions, such as treating 'Anytime' ticket revenue as an indicator of business travel, which could lead to inaccurate results.

Survey evidence could provide a better proxy, but collecting it across all segments would be disproportionate and capture only a point-in-time view.

In addition, passenger services are likely to carry a mix of passenger groups, making it difficult to identify a dominant group. Operators could also alter their ticket mix to influence their segment classification, creating scope for gaming and perverse incentives.

Option 3: segments based on specific corridors

Corridors capture several factors that may influence ability to pay to a mark-up, including the cities served, infrastructure, rail competition, and alternative transport options. However, they are broad and may group

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services with materially different abilities to pay. Further segmentation could address this but would make the approach more complex.

A key practical challenge is defining major corridors and assigning services to them, as a service may serve several markets or corridors. Clear allocation rules are needed to ensure the segmentation can be applied transparently and consistently without unnecessary complexity. This is particularly challenging in the GB context, where key mainlines carry a mix of commuter, regional, and long-distance services, and services often span multiple lines.[24] Corridor characteristics may also change over time, for example when a new operator enters the market.

Option 4: segments based on operating models

This is the only option that identifies services with different operating models and cost structures, which may influence ability to pay a mark-up. Although most passenger services may operate in broadly similar ways, some specialist services are likely to have very different cost structures.

On its own, however, this option is unlikely to segment the market effectively, as demand-side factors are likely to be more relevant for most services. Aspects of this option may therefore be better integrated into the other approaches than used as a standalone approach.

Summary of evaluation

Table 3.3 below summarise the key strengths and limitations of each of the four options.

Table 3.3 Summary of evaluation

	Strengths	Limitations
Option 1: segments based on market size	Market size is likely a key driver of ability to pay and is practical to observe and measure using objective, readily available metrics such as station usage and population size.	Market size alone does not capture other drivers of ability to pay, including service operating models. Clear, data-supported thresholds are needed, and the segment

[24] This is in contrast to some European markets, such as France, where there are dedicated lines for long-distance high-speed services. In contrast, in GB currently High Speed 1 is the only dedicated high-speed line.

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		boundaries require further refinement to distinguish markets robustly.
Option 2: segments based on journey purpose	Journey purpose affects passengers' price sensitivity and willingness to pay, making it relevant to a service's ability to pay a mark-up.	Journey purpose is not directly observable. Ticket type is an imperfect proxy and requires simplifying assumptions that may produce inaccurate results. Services carry mixed passenger groups, making a dominant journey purpose difficult to identify.
Option 3: segments based on specific corridors	Corridors capture several factors affecting ability to pay, including the cities served, infrastructure, rail competition, and alternative transport options.	Corridors may group services with materially different abilities to pay, while further segmentation would increase complexity. Major corridors are complex to define and service allocation is challenging, as services can use multiple corridors.
Option 4: segments based on operating models	This is the only option that identifies services with different operating models and cost structures that may influence ability to pay a mark-up, particularly specialist services.	On its own, this option is unlikely to segment the market effectively because demand-side factors are likely to matter more for most services. Relevant aspects may be better integrated into other approaches than used as a standalone approach.

Each option has strengths and weaknesses. On balance, we consider market size, the basis of Option 1, to be the strongest and most practical foundation for a robust segmentation approach. Market size is likely to be a key driver of demand, fares, and therefore the ability to pay a mark-up, and can be measured using objective, readily available data.

Assessing a service's ability to pay a mark-up may also require consideration of its operating and cost structure where these differ materially. Although Option 4 is unsuitable as the primary basis for segmenting all services, it can help account for specialist services with substantially different cost structures.

Journey purpose, the basis of Option 2, is relevant, but there is no practical and robust way to account for it directly. Market size may capture some of its effects: larger markets are likely to have more business and commuter passengers, who may have a higher willingness

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to pay. Option 3 captures a broader range of characteristics, including rail competition, which may be the most relevant factor not already reflected in Option 1. As discussed in section 3.4.2, we propose to account for competition separately.

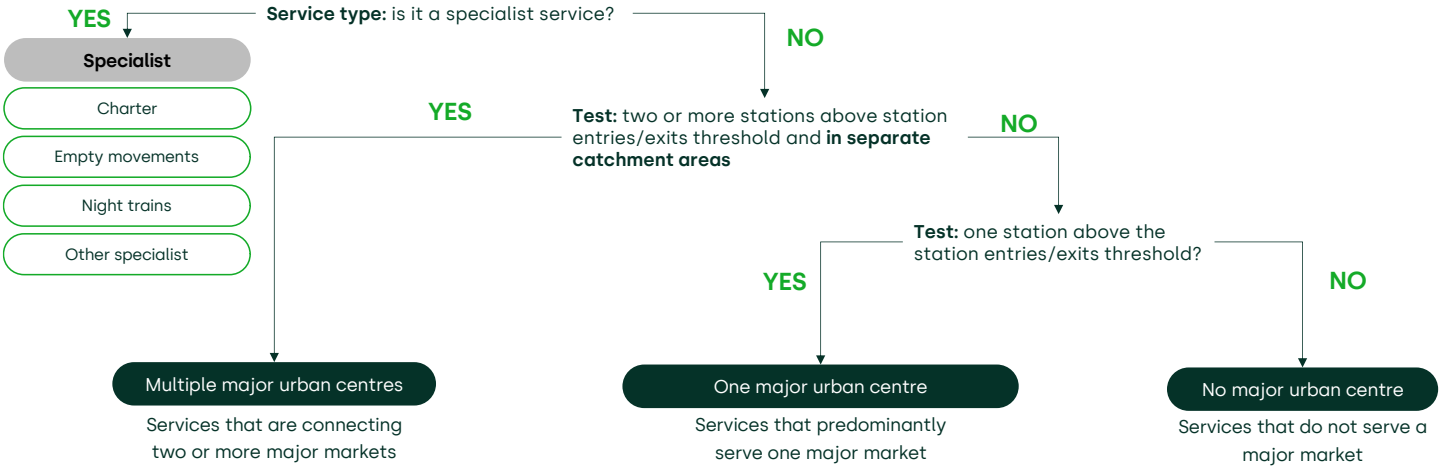
We therefore propose taking forward Option 1, supplemented by relevant specialist categories from Option 4. This would provide a practical primary framework for market segmentation.

3.4 Developing our recommended option

Our recommended option combines Option 1's market-size approach with Option 4's specific treatment of specialist services. We use this combination to advance a comprehensive segmentation methodology for the GB context.

Figure 3.5 summarises the recommended option, showing how each service code is allocated to a primary segment.

Figure 3.5 Recommended option—allocation of service codes to primary segments



Source: Oxera.

We now explore the design of this approach in greater detail, including how to ensure the ultimate segmentation robustly distinguishes between services with different abilities to pay.

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3.4.1 Details on the design of the recommended option

Defining segments for specialist services

The addition of specialist categories (based on Option 4) recognises that some services may have materially different operating models and cost structures. Specialist services are therefore grouped into separate segments as the first step in the process.

Distinguishing between multiple, one, or no major urban centre

For non-specialist services, the proposed approach distinguishes between services that serve two or more major urban centres, services that serve one major urban centre, and services that serve no major urban centre.

As set out in section 3.3.1, a more gradual approach using a greater number of segments could be considered. However, its merits should be assessed in the context of the wider framework and the severity of any 'cliff edges' resulting from a fewer number of segments, as identified through quantitative analysis.

Based on first principles, we consider that our recommended segmentation, strikes the right balance between distinguishing services with different abilities to pay, limiting cliff edges, and keeping implementation manageable.[25]

Selecting the variable for identifying major urban centres

We considered the following long-list of variables, presented in Table 3.4 below, as potential measures of market size in order to define 'major urban centres'.

[25] The recommended segmentation includes more proposed segments than the ORR's current approach, which may help reduce the risk of cliff edges compared to the current situation.

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Table 3.4 Variables for defining market size

Variable	Rationale	Assessment
Station usage	Station usage can be measured using station entries and exits data. It indicates how many passengers have historically used the station and may serve as a proxy for the scale of the associated market.	This is an observable measure that directly reflects rail use. However, demand may be split across several stations, and station usage may understate a market's potential where existing rail services are limited.
Population	The population of a city or defined catchment area provides an indication of the potential passenger base.	Population provides a broader measure of potential demand across an area. However, it does not show whether, or how, people use rail, or where passenger demand is concentrated.
Service frequency	More frequent services to a station or within a defined area may indicate substantial demand and an established market.	Service frequency is readily observable, but reflects both supply and demand. A high frequency does not necessarily indicate a large underlying market, while a large market may have limited service frequency because of capacity constraints or operational decisions. In addition, station usage is likely to provide a more direct measure.
Connections and interchange	The availability of connections to other services or destinations may indicate the breadth of travel opportunities a station supports, and therefore the scale of the market it serves.	The number of connections does not show how many passengers use them or how commercially important they are. Connection measures also depend on how interchange is defined, including acceptable waiting times and whether connections are reliable. In addition, station usage is likely to provide a more direct measure.
Gross value added (GVA)	GVA provides an indication of economic activity in the areas served and may be associated with demand for business and other high-value travel.	While GVA may help distinguish markets by economic scale, it is an indirect proxy for rail demand, as it does not directly measure passenger numbers. Its usefulness would also depend on how the geographic catchment area is defined.
Employment	Employment levels in the areas served may indicate the potential for commuting and business travel demand.	While employment is relevant to work-related travel, it does not directly capture potential demand for other types of journey.

We do not consider service frequency or connections and interchange suitable measures of market size. They may help to characterise a market, but are strongly influenced by the supply-side factors, including

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timetable design and operators' service choices.[26] Moreover, we consider that station usage is a more direct measure for the scale of the associated market.

We therefore assessed the strengths and limitations of the remaining variables, as summarised below.

- **Station usage** is clearly defined, and station entries and exits data is readily available. It captures existing passenger demand at individual stations, providing a precise view of where demand is concentrated and recognising that stations within the same city may differ in their ability to support services with an ability to pay a mark-up. However, demand may be split across several stations, and station usage may understate a market's potential where existing rail service provision is limited.[27]
- **Population size** provides a broader measure of potential demand across an area. However, it does not show whether, or how, people use rail, or where passenger demand is concentrated. A large population may generate substantial travel demand, but that travel may be made by other modes of transport, depending on factors such as the available infrastructure. Although granular population data is available, defining the boundaries of a population centre or catchment can be challenging. Population measures may also fail to accurately reflect the actual demand a rail service could effectively capture.
- **Variables measuring economic activity (GVA and employment)** describe the potential scale of economic activity across an area. However, they are not directly linked to rail passenger demand. High-GVA or high-employment areas may be associated with greater travel demand, but these metrics do not show which modes people use or which stations they travel from. Results may also vary depending on how GVA is defined, for example, whether it is measured by place of residence or place of work. Employment totals do not show where workers live or capture other journey purposes, and may therefore misrepresent the potential rail market's size.

[26] Their use would also require clear and consistent definitions. For example, a measure of connections would need to specify what counts as an interchange and what constitutes an acceptable waiting time.
[27] Low station usage in a large population centre could indicate an underserved market with potential to support additional services. Alternatively, it may reflect infrastructure constraints, such as low line speeds, which could continue to limit demand even if services were expanded.

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On balance we consider station usage, measured by passenger entries and exits, to be a more direct indicator of rail market size. It therefore provides a stronger basis for setting the 'major urban centre' threshold and assessing the ability to pay a mark-up. While population and economic activity measures describe the wider potential of an area, station usage shows where passengers currently use rail and, therefore, where there is a demonstrated market for rail services. It also recognises that stations within the same geographic area may have different levels of use and potential relevance to rail services.

Station usage is also more practical to implement, as the ORR's existing 'interurban' definition already uses station entry and exits alongside distance criteria. Using station usage data would avoid the need to define population- or employment-centre boundaries, although the criteria for identifying stations that serve the same 'major urban centre' would still need to be specified, as discussed below.

This approach may underestimate the potential ability to pay a mark-up for a new service calling at previously underserved station.[28] If that service subsequently increases passenger journeys, the resulting increase in station usage could then be reflected in the next assessment period (subject to the review timetable and the approach for updating the thresholds).

Additional considerations when designing the station usage threshold

There are two additional design considerations given the use of station usage to define major urban centres.

- **Services calling at a smaller station near a larger station:** a service may have an incentive to call at a smaller station below the major urban centre threshold, rather than a nearby larger station above the threshold, to avoid paying a mark-up.[29] This is likely a genuine issue only where the stations are close together (e.g. within walking distance), as stations within the same city can have materially different market potential as discussed above. We therefore recommend, consistent with the ORR's

[28] One way to assess whether a station may be underserved is to examine the average number of rail journeys made per person in the catchment area. A low figure may indicate untapped demand for rail. However, this is an indirect measure, and other factors (e.g. quality of infrastructure and availability of alternative modes) may also influence the result.
[29] For example, calling at Waterloo East instead of London Waterloo; calling at Manchester Oxford Road or Manchester Victoria instead of Manchester Piccadilly.

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approach, treating services calling at neighbouring stations within a defined radius as serving the same urban centre.[30]

- **Services calling at two or more stations above the major urban centre threshold in close proximity:** in large cities, a service may call at multiple nearby stations that each exceed the threshold, such as London Waterloo and Vauxhall. To ensure consistency with the approach above, we recommend applying the same radius rule: stations above the threshold would be treated as serving the same urban centre where their defined catchment areas overlap.

In effect, a major urban centre is defined by a station that exceeds the station-usage threshold and the area within its catchment. The approach to calibrating the station usage threshold is discussed below. The appropriate catchment radius will require further consideration.

Calibrating the station usage threshold

Station usage thresholds should identify the point at which an urban centre is large enough to support services with a materially different ability to pay a mark-up.

In line with the principles set out in section 3.1, thresholds should ensure that segment definitions remain robust throughout the assessment period. They should also minimise distortions and the impact of any 'cliff edges', which can occur when services serving urban centres of only slightly different sizes face substantially different mark-ups.

For example, under the ORR's current approach, qualifying 'interurban' services pay a mark-up of £5 per train mile, while services serving major stations just below the relevant thresholds are not charged a mark-up. As a result, a small difference in station usage could in theory lead to a substantial difference in the mark-up applied.

In order to avoid this, thresholds will need to be calibrated using data on the net revenue of services calling at different stations. The aim would be to identify clusters of services with similar abilities to pay a mark-up and set thresholds between, rather than within, those clusters. As discussed above, a more gradual approach using more segments can also be considered.

[30] The ORR currently uses a two-mile straight-line radius. Office of Rail and Road (2019), 'Open access infrastructure cost charge implementation: Conclusions document', 21 March, p. 22.

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Initially, we propose to use the same station-usage threshold to define a major urban centre across all segments. If needed to distinguish robustly between segments with different abilities to pay and minimise distortion, thresholds could vary by segment. For example, in the 'multiple urban centre' segment, different thresholds could apply to the first and second major urban centres served.[31]

3.4.2 Further considerations

Further sub-segmentation using additional variables may be needed to distinguish more accurately between services with different abilities to pay. Any sub-segmentation should be proportionate, adding no more complexity than necessary. A decision rule will therefore be required to ensure that sub-segments are introduced only where they materially improve the framework.

The remainder of this section sets out potential sub-segmentations for consideration. As it is not possible to determine from first principles alone which options would meet the decision rule, each will need to be tested using quantitative analysis.

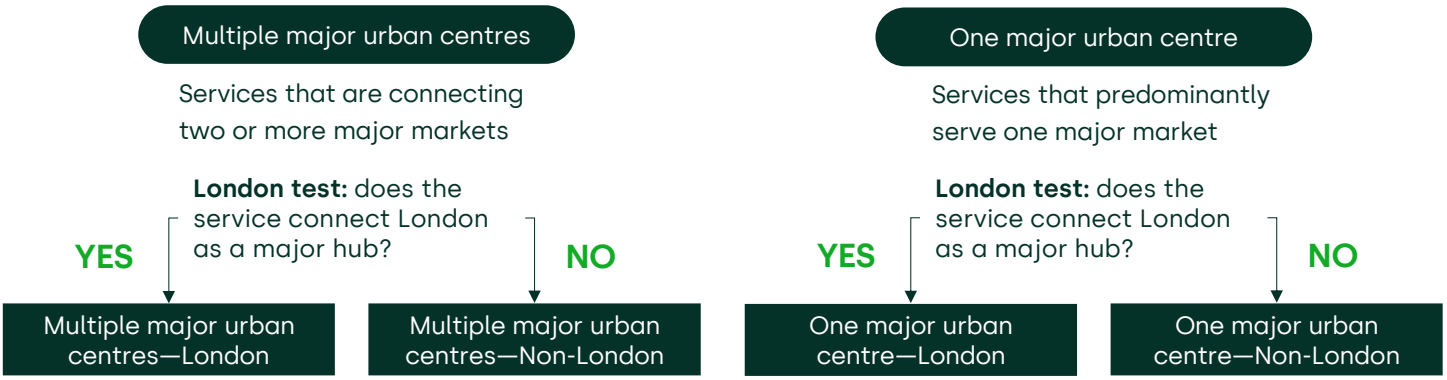
Distinguishing between London and non-London major urban centres

The 'multiple major urban centres' and 'one major urban centre' segments could be further divided according to whether at least one of the major urban centres served are in London, as illustrated in Figure 3.6.

[31] Using two different station usage thresholds to define the 'multiple urban centres' segment would be similar to the ORR's current approach to defining its 'interurban' segment. See Office of Rail and Road (2019), 'Open access infrastructure cost charge implementation: Conclusions document', 21 March, pp. 21–22.

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Figure 3.6 London sub-segmentation



Source: Oxera.

There may be first-principles reasons why urban centres in London can support services with a higher ability to pay. For example, passengers may have a greater willingness to pay, allowing operators to charge higher fares, perhaps because of higher incomes or a larger proportion of business and commuter passengers. Several London stations also have materially higher entry and exit figures, which may support further sub-segmentation from services serving other major urban centres. Although those centres may also be large, they may not offer the same market potential as London. These hypotheses would need to be tested through quantitative analysis.

Distinguishing services by distance or stopping pattern

The recommended primary market segments do not distinguish services by distance travelled or stopping pattern. As a result, long-distance services with few stops, such as intercity services, may be allocated to the same segment as short-distance services with frequent stops, such as commuter services.

In principle, these service types may differ in their passengers' journey purposes and willingness to pay, and therefore in the service's ability to pay a mark-up. Moreover, open access passenger services may find it harder to compete with services whose fares are regulated and subsidised, as is more likely to be the case for commuter services. However, it is difficult to establish the extent or direction of any difference without quantitative analysis, or to identify a clear threshold

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for distinguishing between commuter and intercity services.[32] Therefore, this will need to be tested using quantitative analysis.

Airport services

The ORR currently defines a separate market segment for services that call at a station (or stations) that directly serve an airport and have average entries and exits above 5m passengers per year.[33] The ORR adopted a lower station entries/exists threshold compared with its definition of the 'interurban' segment because of the nature and type of passengers using airport services, where fares are generally higher on average than in the interurban market, leading to higher average net revenues.[34]

Quantitative analysis will be required to assess whether the recommended segmentation approach adequately accounts for airport services, or whether they should be treated as a distinct segment to reflect their potentially different ability to pay.

Accounting for competition

The primary segmentation does not account for differences in competitive conditions. In practice, however, these are likely to matter, because the ability to pay a mark-up is influenced by the extent to which mark-ups can be passed on to passengers through higher fares without materially reducing demand.

An operator's ability to pass on a mark-up depends on how passengers respond to fare increases and on the availability of alternative services. Generally, an open access operator facing a close on-rail competitor may have less scope to individually raise fares if passengers can switch to the competing service in response to its fare increase. An operator with no on-rail competitor may face less direct competition, but its ability to raise fares remains constrained by passengers' sensitivity to

[32] The ORR's current approach to defining the interurban segment combines station entry and exit thresholds with a minimum distance between two stations (40 miles). Office of Rail and Road (2023), 'PR23 final determination: Policy position – access charges', 31 October, p. 17. Distance may help distinguish short- and long-distance markets, but the appropriate threshold is not self-evident. Moreover, because a per-train-mile mark-up increases with the distance operated, distance already affects the total charge. Its relevance to segmentation therefore depends on whether there is a structural break in the relationship between fares and distance, for example, because journey purpose affects how fares vary with distance.
[33] For the full definition, see Office of Rail and Road (2023), 'PR23 – Review of Network Rail's access charges: Further consultation on open access airport services', 1 August, p. 12.
[34] Office of Rail and Road (2023), 'PR23 final determination: Policy position – access charges', 31 October, p. 24.

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price and by alternatives such as other transport modes or not travelling.

The effect of a mark-up also depends on how it applies to competing services. Where competitors face comparable mark-ups on the same basis, the charge may not materially alter their relative costs. This may reduce the risk that one operator gains a cost advantage over another, but it does not guarantee similar fare increases or pass-through. This is because operators may face different demand conditions, for example because of other service characteristics, and may have different cost structures.[35] Moreover, even if competing operators raise fares symmetrically, this is likely to reduce demand across their services collectively (at least to some extent).

In the GB rail context, an open access passenger service may compete with a GBR service that is not subject to the same mark-up.[36] The charge would then increase the open access operator's costs relative to its GBR competitor. If the open access operator raised fares, some passengers might switch to the GBR service, limiting the amount it could pass on. The open access operator might instead absorb some or all of the charge, reducing its profits.[37]

Table 3.5 Competition scenarios

Competition scenario	Implication for assessing ability to pay a mark-up
Open access service facing no on-rail competition	Pass-through depends on passengers' sensitivity to price and the availability of other non-rail alternatives. Any portion not passed on may reduce the operator's margins or profits.

[35] According to economic theory, if the market were perfectly competitive, with a homogenous product, and both operators faced the same cost shock, they would both pass through 100% of the cost. However, for the reasons stated above, this might not be the case in practice. See Oxera (2018) 'Pass it on: the draft EU guidelines on pass-on and volume effects', October 26.
[36] An additional consideration is that open access passenger services may find it harder to compete with GBR services whose fares may be regulated and subsidised.
[37] Estimating the level of pass-on is complex and is influenced by many factors. For example, pass-on depends on whether the charge is fixed or variable. While the mark-up is proposed to be charged per mile, operators are unlikely to be able to easily change how many miles they operate to avoid the charge, so the mark-up may be more 'fixed' in nature, and therefore less likely to be passed on. See Oxera (2019), 'If you don't know, you can pass: pass-on at the interface of economics and law', July 29.

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Competition scenario	Implication for assessing ability to pay a mark-up
Open access service versus GBR service	If the GBR competitor does not face the same mark-up, the charge increases the open access operator's costs relative to its competitor. The operator may try to recover the charge through higher fares, but this could lead some passengers to switch to the GBR service, limiting how much it can pass on. Any portion of the charge it cannot pass on would need to be absorbed, reducing its margins or profits.
Open access service versus open access service	Assuming both operators face comparable mark-ups on the same basis, the charge may not materially change their relative costs. This does not ensure equal pass-through as differences in demand, cost structures, or pricing strategies may lead to different outcomes. If competing operators raise fares symmetrically, this may reduce demand across their services overall.

There are two ways to account for competition within the framework:

- define sub-segments for services facing different competitive conditions;
- reflect the effects of competition when calculating the level of the mark-up.

Given the complexity of assessing how competitive conditions affect a service's ability to pay a mark-up, defining sub-segments is likely to be difficult to implement and may not be flexible enough to accommodate different scenarios. We therefore recommend reflecting the effects of competition when calculating the level of the mark-up.

A1 CMA and PDFH approaches

We reviewed two existing approaches to passenger rail market segmentation used in other contexts: the CMA's 2018 rail franchise merger guidance and the PDFH approach to market segmentation.

Both are applied to individual passenger flows (i.e. considering passengers' origin and destinations), rather than to entire services.

A1.1 CMA's 2018 rail franchise merger guidance

The CMA's 2018 franchise merger guidance assesses whether a rail

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franchise merger may reduce competition.[38] It defines markets around point-to-point origin–destination flows, identifies flows where the merging parties overlap, and applies filters to prioritise those requiring further analysis. The remaining flows may then be assessed using evidence such as differences in Generalised Journey Cost (GJC), revenue-retention ratios calculated using MOIRA, and the incentives to raise fares.[39]

This approach is not suitable as a standalone framework for determining mark-ups. It is designed to assess the effect of a merger on competition (in terms of impacts on prices and service provision), not to establish whether a service can afford to pay a mark-up. Its focus on overlapping flows would also leave flows without an on-rail competitor outside the CMA-style overlap assessment, even though these services would still need to be considered for mark-up purposes.

A1.2 PDFH segments

PDFH groups passenger journeys by geography, including journeys within the London Travelcard Area, between London and the South East, between London and the rest of the UK, non-London short- and long-distance journeys, and airport flows. It also considers journey purpose and ticket type as additional dimensions.

When forecasting passenger demand, it is appropriate to distinguish between origin-destination pairs (i.e. flows). However, when setting mark-ups, the relevant consideration is the ability to pay of the service as a whole. A service may carry passengers travelling between many different origin-destination pairs, making it impractical to assess its profitability by decomposing it into each individual flow.

[38] Competition and Markets Authority (2018), 'Rail franchise mergers: Review of methodologies and guidance', 15 March.
[39] To test the substitutability of overlapping rail services, the CMA can use MOIRA, the rail industry's standard model. The model is used to estimate passenger allocation in response to changes to services, such as timetable changes. For more details, see Competition and Markets Authority (2018), 'Rail franchise mergers: Review of methodologies and guidance', 15 March.

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