steer davies gleave

RAIL VALUE FOR MONEY STUDY

DfT / ORR

Research Project on Fares

Contract No: NRP10026

Final Report: analysis, recommendations and conclusions

28th February 2011

RESEARCH PROJECT ON FARES

steer davies gleave

RAIL VALUE FOR MONEY STUDY

DfT / ORR

Research Project on Fares

Contract No: NRP10026

Final Report: analysis, recommendations and conclusions

28th February 2011

RESEARCH PROJECT ON FARES

Prepared for:

Rail Value for Money Study
5th Floor
55 Victoria Street
London
SW1H 0EU

Prepared by:

Steer Davies Gleave
28-32 Upper Ground
London
SE1 9PD
+44 (0)20 7910 5000
www.steerdaviesgleave.com

Although this report was commissioned jointly by the Department for Transport (DfT) and the Office of Rail Regulation (ORR), the findings and recommendations are those of the authors and do not necessarily represent the views of the DfT and the ORR. While the DfT and the ORR have made all reasonable efforts to ensure the information in this document is accurate, the DfT and the ORR do not guarantee the accuracy, completeness or usefulness of that information; and cannot accept liability for any loss or damages of any kind resulting from reliance on the information or guidance this document contains.

Department for Transport
Great Minster House
76 Marsham Street
London SW1P 4DR
Telephone: 0300 330 3000
Website: www.dft.gov.uk

Office of Rail Regulation
1 Kemble Street
London
WC2B 4AN
Telephone: 020 7282 2000
Website: www.rail-reg.gov.uk

Steer Davies Gleave
28-32 Upper Ground
London SE1 9PD
Telephone: 020 7910 5000
Website: www.steerdaviesgleave.com

CONTENTS

FIGURES

TABLES

APPENDICES

Executive Summary

Purpose of the study

1. In December 2009 the Secretary of State for Transport announced an independent review of value for money in the rail industry, to be led by Sir Roy McNulty. A scoping study, published in June 2010, noted that the overall costs of running Britain's railway has risen but income from users has not kept pace, meaning an increased call on the taxpayer.

2. Other studies already under way are examining the costs of the industry. On 1 December 2010 Steer Davies Gleave was appointed to carry out a "Research Project on Fares" in two parts:

   - Part One, "current fares issues", submitted on 20 December 2010
   - Part Two, "analysis, recommendations and conclusions", subsuming Part One to describe the whole study in a single document:
     - Submitted on 19 January 2011 in Draft Form
     - Submitted on 28 January 2011 in Final Form
     - Revised on 28 February 2011 and renamed "Final Report", following comments from the study steering group

3. The ultimate aim of this research is to clarify and quantify the most important options regarding how best to change the absolute and relative levels of key fares to achieve a number of objectives including raising total fares revenue, improving network utilisation, correcting anomalies and distortions and paying due regard to the distributional impact of proposed changes, or "fairness" (Figure 1.1). The issue of defining new and economically relevant regulatory objectives is also discussed in this report (4.38).

Evolution of fares policy and regulation

4. Rail revenues from passengers are determined by fares, of which there are around 100 million at any one time, updated three times a year for the January, May and September fares reviews. Each year, 300 million fares are defined by the operators, checked for internal consistency and regulatory compliance, loaded into railway revenue systems and made available through retail channels. The overwhelming majority of these fares are never used, because they relate to journeys which are never made (2.1).

5. The levels and structure of fares have been set not primarily by reference to costs but through history, market forces and regulation (2.2). More specifically, fares can be set on the basis of:

   - "Value" to the passenger, subject to what can be charged in the market place
   - "Fairness" to and between passengers in different markets, in some cases applied through formal regulation
   - "Costs", however determined and applied to individual fares

6. Railway fares were regulated in the first half of the nineteenth century but a large number of changes accumulated during the twentieth century, particularly under the British Railways Board (BR) when formal regulation was replaced by pursuit of two conflicting objectives (2.26):

   - Pressure to minimise subsidy requirements
   - Concern that commuter fares should not rise excessively relative to inflation

7. Fares offered by franchised rail operators are based on the level and structure of fares inherited from BR in 1995 (2.28). However, application of the "RPI-X" regulatory mechanism common[1] in other regulated industries to "fares baskets", rather than individual fares, has resulted in changes to the relative levels of fares, in some cases as operators have exploited opportunities to maximise revenues within the regulatory system.

8. In most markets, unrestricted fares for immediate travel are more expensive in Great Britain than in other major European railways. However, systems of market segmentation and yield management, which were introduced in Great Britain by BR and have been extended by the private sector operators, are generally less developed on other railways. This means that advance purchase fares for long distance travel in Great Britain are as low as, or lower than, elsewhere in Europe. Passengers in Great Britain often benefit from more frequent services, earlier first trains and later last trains than elsewhere (Table 2.3).

9. BR's policy of "charging what the market will bear", which the private sector operators have continued where they are able to do so, has resulted in significant variations in fares for individual journeys and between regions, although commuting is consistently more expensive in London than in other cities. To the extent that these variations have resulted from profit-maximising behaviour, raising fares elsewhere to London levels might generate relatively little additional revenue (Appendix C1.31).

Key issues

10. Industry stakeholders interviewed about the effects of current arrangements generally favoured less regulation and a simplification of industry processes and structures. These were seen as a constraint on innovation, cost reduction and the realisation of revenue-generating opportunities. There was, however, a consensus favouring regulation of fares for peak travel into London, where rail has a dominant position (3.3, Appendix D).

11. We reviewed a number of other effects of the current level and structure of fares:

    - The lack of financial incentives to season ticket holders to travel outside peak periods or less frequently (3.48).
    - The availability of regulated long-distance fares into the shoulder peak period, creating artificial peaks in demand which operators are increasingly unable to manage to within capacity, resulting in crowding, queuing and, in some cases, an inability to board the intended train (3.26).

[1] "RPI-X" refers to the regulatory system but the value of X may be either positive or negative.

- The combination of inconsistent pre-privatisation fares and regulation permitting some relative changes in pursuit of profit-maximisation means that, while some variations and anomalies are being eliminated, others are being introduced. Tighter control of movement of fares from current levels would perpetuate the existing inconsistencies, but complete consistency could only be imposed by reverting to distance-based fares standardised nationally, which we do not recommend (3.38).
- The operators' flexibility to reduce or discount fares to stimulate demand will, in the absence of national distance-based fares with no discounts, inevitably lead to situations where it is difficult to find the cheapest combination of fares. The cheapest fares for each part of the journey may total to less than the through fare identified by standard ticketing systems. Collusion among operators to prevent this happening could attract the attention of the competition authorities (3.36).
- While some past increases in fares following major investment have been presented as being linked to improvements in costs or quality, we are not aware of any examples in which such a calculation has been made. A formal link between investment or quality and fares could add confusion over how the regulated fares cap has been set (3.47).

12. The current structure of regulation has created expectations of "fairness" between different types of fare and passenger. Changes to any of a number of features of regulation, whatever the underlying commercial, economic or social justification, will create losers and are likely to be seen as "unfair" (Table 4.1).

Relating fares to costs

13. Economic principles suggest that the price of products should be set at some measure of marginal cost. The Strategic Rail Authority's Fares Review 2003 concluded that fares should, in theory, reflect long run marginal cost (LRMC). However, given the practical difficulties of applying such an approach, it proposed further investigation of LRMC pricing rather than recommending it as a basis for immediate reform of the structure and regulation of fares (4.23).

14. Previous experience of attempts to allocate railway operating and infrastructure costs to service groups (Appendix E5), let alone to trains or individual passengers, indicates that rigorous application of such an approach would:

    - Require a major and intrusive industry-wide costing model
    - Require many additional and essentially arbitrary assumptions to determine individual fares
    - Almost certainly generate results which varied widely with route and service group
    - Worsen crowding where the calculated LRMC was lower than current fares

15. Given this range of issues, the outcome of such a process cannot be predicted in advance with any confidence.

16. There is an economic rationale for selectively raising fares to at least "market-clearing" levels, at which demand is reduced to within capacity, as a proxy for pricing to reflect short run marginal cost (SRMC) and crowding externalities. In our

view, such an approach could both encourage efficient use of existing capacity and increase overall passenger revenue (4.30).

Objectives for fares regulation

17. Against this background, we reviewed the SRA's objectives for fares regulation and set out in the table below our own proposals for objectives to be adopted in the future. Objectives cannot, in themselves, specify individual fares or how they should be set, which will depend, inter alia, on Government's policy on the relative weighting to be given to conflicting objectives (4.38).

Our proposed new objectives for fares regulation

	Objectives
1	Fares regulation should protect passengers from abuse of monopoly power
2	Passengers using peak services should pay fares that reflect the costs of providing peak capacity
3	The structure of fares should encourage efficient use of available capacity
4	The system of regulation of fares should be designed to minimise the associated administrative burden on the industry
5	The system of regulation of fares should allow for the correction of externalities in the wider transport system
6	The structure of fares should have regard to perceptions of fairness and the need to ensure that vulnerable groups have access to affordable rail travel

Options for further investigation

18. We did not examine the value of X in the "RPI-X" regulatory formula, which the McNulty review has already concluded is essentially a policy decision for Government (5.2).

19. We identified, but have not considered in detail, two extreme options of a standardised distance-based national fares system (5.4) and complete deregulation of all fares (5.11).

20. We identified nine specific options for changes to the level and structure of fares, which are set out in the table overleaf. On 21 December 2010, following our Report on Part One, we agreed to analyse in Part Two the five options highlighted in bold.

Option		Rationale and potential effects
1	**Peak-spreading**	**In London and other urban areas, enforced 2- or 3-tier pricing of travel to redistribute demand between high, shoulder and off-peak. Peak and probably shoulder peak fares would need to rise, and re-regulation might be required to make off-peak fares fall**
2	**The price taper on season tickets**	**Making season ticket fares more proportional to distance travelled and reducing the discount compared to other fares offered at longer distances**
3	**The Standard Off-Peak Return**	**Review of the pricing, availability and regulation of shoulder-peak "walk-up" fares which fail to contain demand within capacity**
4	Regulate long-distance Anytime	Extension of Anytime regulation might be necessary or desirable to support higher or deregulated Standard Off-Peak Returns or higher long distance season ticket prices
5	Single leg pricing	Regulating a Standard Off-Peak Single instead of the Return could simplify fares selection and improve incentives to travel in the deeper off-peak on at least one leg of a return trip
6	Railcard discounts	Railcards could be made more expensive, students and other young people could be separated, or the discount associated with them be lower or limited to a smaller range of tickets
7	Products for part-time commuters	Where pay as you go is not appropriate, new products intermediate between Anytime Day and season fares may generate revenue and help manage demand
8	**An absolute fares cap by ticket type**	**Introduction of a national distance-based cap on one or more types of regulated fares could allow the removal of anomalies**
9	**The composition of the fares basket**	**Contraction, expansion or subdivision of the fares basket may be necessary to implement or to retain the effects of other options**

Analysis and conclusions

21. We summarise in turn below our analysis and conclusions on the options analysed.

Option 1, peak-spreading

22. Peak-spreading, through increased differentials between distinct peak, shoulder peak and off-peak fares, could help address Objective 3, encouraging efficient use of available capacity. It would also address Objective 2, ensuring that passengers using peak services pay fares that reflect the costs of providing peak capacity and Objective 6, fairness between commuters and other passengers (6.110).

23. However, our literature review and subsequent analysis have identified a number of potential constraints to, and consequences of, the introduction of peak-spreading measures, including:

- The limited spare capacity on shoulder peak services, unless rolling stock fleets are expanded to allow high peak service levels to be sustained over a longer period (Figure 6.2).
- In London, the relatively small differentials in TfL fares which apply to all commuting within the Travelcard area. Fares differentials for commuting from outside London will be constrained by interaction with TfL fares and would only affect a proportion of passengers, limiting their potential effect (Figure 6.3).
- The possible need to extend regulation to off-peak fares to force operators to create and maintain the required fares differential (6.42).
- The need for any scheme to be carefully designed to be internally-consistent, intelligible to passengers, simple to use, and avoid unintended consequences.

24. Nonetheless, while overcrowding remains there is no reason why fares differentials should not be increased as far as possible within any practical constraints (6.100).

25. Our initial analysis suggests that peak spreading is potentially valuable but also potentially complex. Extensive further analysis would be required to validate a model capable of addressing all the relevant issues (6.109).

26. In London, peak-spreading applied only to national rail services could have the counter-productive effect of replacing long-distance passengers displaced from high peak services with short distance ones using Transport for London (TfL) Travelcards. We conclude that peak-spreading could only be effective if TfL participates (6.80).

27. The first decision for Government and TfL might be how far they were willing to allow the headline high peak fare to rise, which might need to be as much as 40%. Some of those affected would be relatively low-income inner London commuters. The second decision would be whether to regulate off-peak national rail fares to underpin peak-spreading, or to leave them unregulated, potentially allowing them to rise and generate additional revenue (6.113).

28. This means that the net revenue impacts of peak-spreading are particularly uncertain. If re-regulation of off-peak fares were necessary, then average fares, and hence any net revenue gain, would be an explicit input to the process, rather than an outcome (6.114).

Option 2, the price taper on season tickets

29. The price taper means that season tickets used daily for journeys over 50 miles offer discounts of up to 70% on Anytime fares allowing peak travel. A large discount for long-distance commuter travel, with no penalty for using peak services, is anomalous, although the absolute volume of travel and revenue involved may be small (7.4).

30. Raising long distance season ticket fares would address Objective 2, ensuring that passengers using peak services pay fares that reflect the costs of providing peak capacity, Objective 3, encouraging efficient use of available capacity, and Objective 6, fairness between commuters and other passengers. It would also support sustainability by discouraging long-distance commuting: daily commuters living 60 miles from their work travel over 25,000 miles a year, equivalent to at least one round the world trip.

31. The rationale for raising long distance season ticket fares would remain strong, even if it affected few passengers and generated little net revenue, because it would remove the existing distortion, and send more consistent signals about the cost of long-distance commuters consuming peak capacity (7.22).

32. Nonetheless, our estimates are that season ticket fares might need to rise by up to 80%, even to be consistently as expensive as Standard Off-Peak Returns (7.18).

Option 3, the Standard Off-Peak Return or "Saver"

33. We also examined the pricing, availability and regulation of shoulder-peak "walk-up" fares, which fail to contain demand within capacity on long distance services. Less restrictive regulation would increase operators' ability to manage demand.

34. Raising regulated off-peak return fares would address Objective 2, ensuring that passengers using peak services pay fares that reflect the costs of providing peak capacity, and Objective 3, encouraging efficient use of available capacity (8.24).

35. There appears to be a good case for pursuing this approach, which could both raise overall revenue and reduce overcrowding. We estimate that allowing the relevant regulated off-peak return to rise by around 40% would raise around £20 million per annum at current revenue levels. Assuming implementation could begin with the January 2013 fares rise, and be completed over a period of 5 years with the January 2018 fares rise, the additional revenue at the end of CP5 would be around £25 million and the cumulative revenue gain by then would be around £125 million (8.20).

36. Our view is that removal of regulation from the regulated off-peak return fare would not allow operators to price up excessively, and that Advance ticket quotas could be used to ensure that shoulder peak capacity was used efficiently but with lower levels of crowding (8.19).

37. If desired, the risk could be mitigated by allowing the regulated fare to rise faster than other regulated fares, but only in relatively small increments, to allow observation of the effects on both revenue and crowding (8.23).

Option 8, an absolute fares cap by ticket type

38. We examined modifying the RPI-X mechanism to allow fares on flows with low yields to be increased faster than others, at least up to a standardised cap on each regulated fare at any given distance. We assumed, for illustrative purposes, that an absolute cap would be set at the ninetieth percentile pence per mile level of the currently regulated Anytime, season and Off-Peak Return fares (9.4).

39. Allowing regulated fares to rise more rapidly towards standard distance-based national caps would help address Objective 2, ensuring that passengers using peak services pay fares that reflect the costs of providing peak capacity, Objective 3, encouraging efficient use of available capacity, and Objective 6, fairness between passengers currently paying different regulated fares for journeys of the same length (9.14).

40. Our modelling suggested that application of consistent national fares caps on this basis and at these levels would raise around £100 million per annum nationally at current revenue levels. A major concern, however, is the rate at which it might be

necessary to raise some individual fares. Achieving a 100% increase in some season ticket fares before the end of CP5, for example, would imply annual fares rises of around RPI+10% from January 2013 to January 2019 inclusive (9.10).

41. However, decisions would be needed on the range of fares to which the new caps would apply, the level at which they would be set, and the rate at which existing fares would converge with them. Decisions would be needed not only on season tickets, as in Option 2, and Off-Peak Return fares, as in Option 3, but also on regulated Anytime fares, where the analysis shows that the greatest additional revenue could be obtained (9.16).

Option 9, the composition of the fares basket

42. We examined a range of changes to a base in which the current fares basket arrangements would continue with a regulatory fares cap of RPI+3% in January 2012 to 2014 and RPI+1% thereafter. In each case we estimated the approach that operators would use to maximise revenue, within the constraints imposed on their ability to do so, by increasing some regulated fares and reducing others (10.10).

43. Changing the composition of the fares basket could help address Objective 2, ensuring that passengers using peak services pay fares that reflect the costs of providing peak capacity, and Objective 3, encouraging efficient use of available capacity (10.20).

44. We selected an option removing the +5% cap on the "flex" on any individual fare, allowing operators freedom to redistribute price rises within the basket. We estimate that this would result in additional revenue of £80 million in the last year of CP5 and a cumulative revenue gain of £350 million by the end of CP5 (10.13).

45. Implementation would be relatively simple, subject to the need for DfT to negotiate with operators to recover as much as possible of the additional revenue they would be able to collect (10.19).

Assessment

46. The results of our assessment of the revenue effects of the Options are summarised overleaf.

47. As context, we assumed that the regulatory fares cap would be RPI+3% in January 2012 to 2014 and RPI+1% thereafter, resulting in a cumulative real rise in the cap of almost 15% between January 2011 and January 2019. This will generate around £200 million additional revenue in 2018/19 and a cumulative total of around £1,000 million by that date (11.7).

48. Allowing regulated fares to rise by an additional 1% per annum for 2015 to 2019 inclusive would generate around £60 million additional revenue in 2018/19 and a cumulative total of around £150 million by that date (11.7).

Option	1	2	3	8	9
	Peak-spreading	Price taper on season tickets	Standard Off-Peak Return	Absolute fares cap by ticket type	Composition of the fares basket
Note: Option 1 is conditional on TfL, Option 8 overlaps with Options 2 and 3					
Additional rise in regulated fares, above RPI+3% 2012 to 2014 and RPI+1% to 2019					
Number of years of additional increase	5	7	5	7	Operator decision
Additional annual rise in total fare basket	+2.3%	+0.5%	+1.4%	+1.9%	None
Additional annual rise in highest-rising fare	+7%	+9%	+7%	+10%	Operator decision
Total additional rise in highest-rising fare	+40%	+80%	+40%	+100%	Operator decision
Indicative additional revenue, at 2010 prices (million)					
In 2018/19	£200	£20	£25	£130	£80
Cumulative to 2018/19	£500	£80	£125	£500	£350

49. With the exception of Option 1, which has been designed with a specific objective of balancing peak and shoulder peak demand, all of the Options are based on illustrative judgments on the extent to which regulated fares could be increased in pursuit of one or more objectives. The actual level of fares rise, and hence the potential additional revenue, is a policy decision for Government.

50. Increases in regulated fares, whether through the RPI-X regulatory formula or through specific Options, will generally produce negative externalities, such as some passengers priced off rail switching to car travel, with an associated increase in road congestion, accidents and carbon dioxide (CO_2) emissions. The total social and environmental disbenefits of fares rises will exceed the additional revenue (11.15).

51. However, the relative disbenefits of RPI-X increases and specific Options will depend on differences in the impacts in different markets, which appraisal techniques based on average rates of diversion to car are not designed to estimate. Quantification of crowding effects is likely to prove highly sensitive to the exact changes in levels of crowding on each corridor and train on each day of the week. We would expect there to be regressive distributional effects, with poorer passengers generally less likely to be able to change the time at which they travel to avoid high peak fares (11.18).

52. In theory, it would be possible to forego the benefits of reduced high peak crowding, and instead to reduce high peak capacity and hence operating costs. In practice, it would probably not be possible either to implement, or to realise material savings from, reductions of high peak capacity equivalent to less than one

vehicle on each high peak train. Indeed, additional rolling stock might be needed to expand shoulder peak capacity (6.22).

53. The principal benefit of reduced high peak demand would therefore be to carry more passengers within existing levels of crowding before requiring additional infrastructure. Analysis of Network Rail data for London[2] suggests that peak-spreading might make it possible to reduce average peak demand by at least 5% (6.20). This might typically allow deferral of infrastructure investment to expand capacity by around two years, but identification and quantification of the potential savings is beyond the scope of this study (6.24). Network Rail commented that the scale of the reduction in peak demand is unlikely to make it possible to delay or avoid infrastructure works at major constraints (for example, the throat of London Waterloo), as the timing of these works is generally determined by life expiry of assets (particularly signalling) rather than by the level of passenger demand, and might require additional rolling stock in the shoulder peak (6.25).

Implementation and timescales

54. Three broad approaches to implementation might be possible (11.39):

- Addressing specific issues through any or all of Options 1, 2 and 3
- Giving operators greater freedom specifically to increase relatively low fares, and hence remove pricing anomalies, through Option 8
- Giving operators wider freedom in how and where to raise fares, through Option 9, with the implicit expectation that the outcome would be driven by their efforts to maximise revenue

55. The timing and speed of implementation would be constrained by three distinct factors (11.40):

- The need to develop the Options further technically and to agree an approach with other stakeholders. This issue applies primarily to peak-spreading Option 1, and we have assumed that the other Options could probably be implemented from January 2013.
- The potential need to ensure that year-on-year rises in individual fares are not excessive, which can be applied to any Option by reducing the maximum permitted annual rise and extending the implementation period. We have illustratively assumed that all the Options could be implemented by January 2019, over at most seven fares rises.
- The need to obtain good value for money for the taxpayer when negotiating with existing franchisees, which we discuss below.

56. Implementation of any of the Options within the life of existing franchises would require negotiation with franchisees, with the aim of reaching an agreement close to "No Net Loss/No Net Gain" (NNL/NNG) for the franchisee. However, our experience is that franchisees are likely to argue that the additional revenue from the proposed changes is limited. It would be poor value for money to incur the economic disbenefits of higher fares but to let a large part of the potential revenue gains be captured by incumbent operators (11.41).

[2] London and South East Route Utilisation Study Draft for consultation, 16 December 2010

57. Negotiation with existing franchisees may offer better value for money where the potential to increase revenue can be estimated with higher confidence. This is most likely to be the case for small changes and in areas where elasticities are well-understood (11.42).

58. Negotiation with existing franchisees is less likely to offer good value for money where they are aware, can deduce, or can show that the estimated gains are subject to considerable uncertainty. Under these circumstances there is a risk that a relatively large proportion of the additional revenue would be captured by the franchisees rather than benefitting the taxpayer. It may therefore be better value for money to defer implementation until franchises are re-let (11.43).

Recommendations

59. We repeat below the recommendations set out in Chapter 12.

Introduction

60. The scale of changes we have described and modelled is intended as an illustration and should not be interpreted as a recommendation.

61. Option 1 has been designed to meet a specific operational objective, of balancing demand across peak and shoulder peak capacity as evenly as possible. Notwithstanding the uncertainties in the associated modelling, our estimates of the revenue and economic impacts of the Option are driven by this assumption.

62. All other Options require a policy input on the extent and speed of change which will be permitted. It would be for the Government to decide by how much it wished to increase fares, how fast, and with what mitigating measures, and whether implementation should begin during existing franchises, which might offer poor value for money, or deferred until they are re-let.

Option 1, peak-spreading

63. If it is decided that peak-spreading should be pursued further, we recommend that:

- Exploratory discussions be held with TfL to share thinking and to discuss the likely scope for agreement on movement to a common peak-spreading fares structure, and in particular any critical technological issues.
- Additional work be carried out by Network Rail to identify if and where peak-spreading could allow capacity expansion schemes to be deferred or avoided.
- Additional research be carried out to improve modelling of passenger reaction to changes in crowding levels and fare, particularly over the longer term. One area which could be examined is whether and by how much demand peaks narrow after capacity expansion, either on national rail or on TfL services.
- Additional analysis be carried out to validate our initial thinking, to identify the practical issues in more detail, and to develop a more detailed working proposal on how, when and where peak-spreading could be implemented and incorporated into the franchise model.
- The effect of the implied move to “pay as you go” and hence single leg pricing throughout the peak-spreading area be investigated.

Option 2, the price taper on season tickets

64. If it is decided that the price taper on season tickets should be reduced, we recommend that:

- Additional analysis be carried out to examine the likely location and number of long distance season ticket holders who would be affected by the proposed increases.
- If necessary, consideration be given to a "hardship" scheme, establishing a register of holders of long period season tickets at a certain date, for whom prices would continue to be regulated at an lower level. As with existing schemes for discounted travel to current and former rail industry employees, such a scheme would need careful design to avoid fraud and to ensure that the pool of beneficiaries declined over time.
- More detailed modelling be carried out of the additional revenue which could be obtained by each operator, with a view to permitting existing franchisees to raise season ticket fares but to return the additional revenue to DfT on a "No Net Loss/No Net Gain" (NNL/NNG) basis.

Option 3, the Standard Off-Peak Return or "Saver"

65. If it is decided that looser regulation of the regulated off-peak return fare should be pursued further, we recommend that:

- These fares be either removed from regulation or put in a separate fares basket
- Average fares in the separate basket, if adopted, are allowed to increase at 7% percentage points per annum faster than other regulated fares, initially for two or three years, and the overall effect be monitored before deciding whether to continue the higher rate of indexing or to remove the tickets from regulation.

Option 8, an absolute fares cap by ticket type

66. If it is decided that a system of national standard caps should be introduced on some or all regulated fares, we recommend that:

- As with Option 1, exploratory discussions be held with TfL to share thinking and to discuss the likely scope for agreement on movement to higher Anytime fares.
- As with Option 2, additional analysis be carried out to examine the likely location and number of long-distance season ticket holders who would be affected by the proposed increases, and consideration be given to a "hardship" scheme.

Option 9, the composition of the fares basket

67. If it is decided that greater flexibility should be given to operators to vary individual fares within the basket, we recommend that:

- Further work be carried out to examine the extent to which this might be exploited.
- Consideration be given to continuing to apply some mitigating constraint on the rate at which individual fares may change.

A possible package for further consideration

68. A possible package for further consideration would be a combination of Options 1, 2 and 3, which address specific issues:

- Option 1 will potentially improve the efficient use of available capacity on high peak commuter services, but considerable additional work will be required before feasibility can be confirmed and a specific scheme can be recommended.
- Option 2 will address anomalously low fares, and help ensure that peak fares reflect the cost of peak capacity, but the actual level to which regulated season ticket fares should rise is a decision for Government.
- Option 3 will potentially improve the efficient use of available capacity on shoulder peak long distance services, but again the constraint on the actual level to which regulated Off-Peak Return and Super Off-Peak Return fares should rise is a decision for Government.

1 Introduction

1.1 In December 2009 the Secretary of State for Transport announced an independent review of value for money in the rail industry, to be led by Sir Roy McNulty ("The McNulty Review"). A scoping study, published in June 2010, noted that the overall cost of running Britain's railway has risen but income from users has not kept pace, meaning an increased call on the taxpayer.

1.2 Other studies already under way are examining the costs of the industry. Its revenues from passengers are determined by fares, the levels and structure of which have been set not primarily by reference to costs but through history, market forces and regulation. On 1 December 2010 Steer Davies Gleave was appointed to carry out a "Research Project on Fares" in two parts:

- Part One, "current fares issues", submitted on 20 December 2010
- Part Two, "analysis, recommendations and conclusions", subsuming Part One to describe the whole study in a single document:
  - Submitted on 19 January 2011 in Draft Form
  - Submitted on 28 January 2011 in Final Form
  - Revised on 28 February 2011 and renamed "Final Report", following comments from the study steering group

1.3 The objectives of the study are summarised in Figure 1.1 below.

FIGURE 1.1 SUMMARY OF STUDY TERMS OF REFERENCE, 2010

The ultimate aim of this research is to clarify and quantify the most important options regarding how best to change the level and structure (i.e. relative levels) of key fares (and/or the regulations which constrain the TOCs' fares policies) with the objective of raising total fares revenue AND at the same time:

a) Improve overall network utilisation by smoothing peaks and troughs (e.g. AM peak, and particularly the core peak v shoulder peak) through options such as flexible ticketing/pricing, including the use of Smartcard technology

b) Correct current anomalies such as the large regional disparities in ticket prices

c) Reduce current artificial distortions, such as the bunching of demand for Saver tickets around time restrictions

d) Pay due regard to the distributional impact of proposed changes, "fairness" issues, such as which type of traveller by region, TOC or income group might most be affected by proposed changes

Of the four issues, the first is expected to be the primary focus of the study and the source of the major potential of revenue (and other) gains.

1.4 On 7 December 2010, shortly after we had begun work, the McNulty Review's September 2010 Interim Submission to Secretary of State was published, including a discussion of revenue and specifically fares, reproduced in Figure 1.2.

1.5 This is our Report on Part Two, on analysis, recommendations and conclusions, the remainder of which is structured as follows:

- In Chapter 2, current fares and their regulation
- In Chapter 3, effects of the current arrangements
- In Chapter 4, possible approaches to setting fares
- In Chapter 5, options for further investigation
- In Chapters 6 to 10, our analysis of each of the options
- In Chapter 11, assessment of the options
- In Chapter 12, a summary of our recommendations

1.6 Chapters 1 to 4 are substantially unchanged from our Report on Part One. Chapter 5 has been modified to reflect the five options selected for analysis in Part Two. Chapters 6 onwards are new material prepared during January 2011 in Part Two of the study.

FIGURE 1.2 EXTRACT FROM MCNULTY REVIEW INTERIM SUBMISSION, 2010

The Study has looked at opportunities to increase **revenue** across the industry, in particular:

- Fares – in terms of revenue maximisation, the Government has at its disposal the mechanism for increasing yield (albeit with difficult practical consequences), in the form of changing the "x" in the RPI + x formula. Such decisions are for Government to take, balancing revenue benefits against the effect on passengers.
- For the purposes of this Study we have looked at other areas of fares reform, essentially aimed at delivering a more market-driven approach, within constraints necessary to protect consumers. Some parts of UK have ticket prices much lower than others (and subsidies per km or per journey are much higher). Season tickets are arguably subsidised more than other fares (or regulation keeps them lower than a market-driven outcome), and longer journeys on season tickets are cheaper on a per mile basis than shorter ones. In addition, fares on particular routes do not necessarily reflect the benefit of recent (often expensive) enhancements to them. The Study team is considering a range of options aimed at giving potential for higher fares yields while offering fairness to customers and improving signals to the market.
- One important area of fares deregulation, which offers potential benefit in terms of revenue generation and the ability to manage capacity/demand without recourse to additional investment in rolling stock/enhancement, relates to giving TOCs more flexibility to introduce demand management options, including differentiated shoulder-peak charging. Comparisons with other rail networks have shown potential for the UK to improve its performance in terms of capacity utilisation, with consequent benefits in terms of VfM, affordability and the offer to passengers. This opportunity could be significantly enhanced by the greater use of smart card technology (see below). However, evidence suggests that shoulder-peak pricing will only succeed in spreading demand if combined with wider fares reform, and would need to address implementation and displacement costs.
- Reform of ticketing – ticket booking and issuance technology is moving forwards rapidly in many countries – and is beginning to be exploited in the UK (e.g., online "best ticket" search, and booking). Further scope for change, for instance with home ticket printing (barcodes as used for flight boarding passes) or direct to mobile, both offer cost savings, and potentially save queues and ticket office space at stations. Smart cards offer significant savings and facilitate peak demand management, providing opportunities for better capacity management (reducing the requirements for infrastructure or rolling stock enhancements) and potentially better VfM through reducing the requirements for infrastructure or rolling stock enhancements.

2 Current Fares and their Regulation

Introduction

2.1 Great Britain's national rail network has over 2,500 stations resulting in over 6 million possible station-to-station journeys, for each of which fares must be available on demand. At any one time there are over 100 million fares, updated three times a year for the January, May and September fares reviews. Each year, 300 million fares are defined by the operators, checked for internal consistency and regulatory compliance, loaded into railway revenue systems and made available through retail channels. The overwhelming majority of these fares are never used, because they relate to journeys which are never made, and a large proportion of the remainder are sold only once.

The structure of fares

The development of fares

2.2 The structure and level of rail fares in Great Britain is determined by a mixture of history, market forces and regulation.

2.3 The Regulation of Railways Act 1844 required all train operators to run at least one "Parliamentary Train" daily providing travel in Third Class at no more than one penny per mile. Distance-based pricing still remains in place on many other railways. With the growth of road competition, rail needed to be more flexible in its approach to pricing, and in 1968 British Railways moved away from distance-based pricing to market pricing.

2.4 Fares were generally increased in line with inflation, with higher increases where investment had been made to improve services or where it was judged that they could be sustained, "charging what the market will bear". Where possible, routed fares were removed and replaced by a fare by "any reasonable route", recognising that markets are defined not by route but by origin and destination. Since privatisation "any reasonable route" has generally been replaced by "any permitted route" as defined in the Routing Guide, where this could be done without creating anomalies.

Pricing by market segment

2.5 Rail's key strengths, moving large volumes of people and offering fast journey times, influence the journey purpose mix on different kinds of flows:

- Around major cities and conurbations, peak commuter travel and off-peak leisure travel.
- On interurban routes, peak volumes generated by leisure travellers, plus significant business travel and increasing longer distance commuting.
- Typically local flows, which are neither commuter nor interurban. These are often leisure-dominated, but may serve niche markets, such as school trips.

2.6 The price elasticities of demand in all rail markets are influenced by the level of competition from car, coach, air and other rail operators. Business and commuter

demand tend to be price-inelastic, due respectively to high values of time and lack of feasible alternatives. Leisure trips tend to be relatively price-elastic.

Class of Travel

2.7 The earliest form of market segmentation on the railway was by class, originally with three classes, reflecting different social classes and ability to pay. Second Class was gradually abolished from the 1870s onwards, Third Class was renamed Second Class in 1956 and again renamed Standard in the 1980s.

2.8 One problem with First Class, where provided, is that the target business demand tends to be highly peaked, particularly for the outward morning journey, resulting in poor capacity utilisation. The long-distance operators have developed yield-managed advance purchase First Class fares to open up spare capacity to the leisure market, generating revenue and relieving crowding in Standard.

Group travel

2.9 Special rates were offered for group travel from the early days of railways and are still available where there is spare capacity on scheduled services. Several operators offer a Groupsave product offering discounts to groups of adults who could have travelled in a single car.

Season tickets

2.10 Season tickets are a longstanding element of the fare structure, with the principal change in their structure being the introduction of zonal pricing and multimodal ticketing in the PTE areas and London. “Out-boundary” Travelcards are available for commuter travel from outside London to inside the zonal and multimodal area.

2.11 Season tickets benefit the commuter, through fewer transactions, and the operator, through lower cost of sales, receipt of payment in advance, and reduced ticketless travel. Longer period season ticket are usually priced as a standard multiple of the weekly price, ranging from 3.84 for a monthly to 40 for an annual, although operators have, and some have used, flexibility to amend this multiplier. However, season tickets in their current form provide no signal of the cost of additional journeys, especially in the peak.

One day validity

2.12 As another protection against ticketless travel, short-distance tickets other than seasons are generally valid for one day only.

Time-away fares

2.13 Time-away fares, available from 1968 to 1985, targeted particular types of journey, as follows:

- Cheap Day Return, generally discounted to around half the normal return price and targeted on leisure trips with morning peak travel to London excluded
- Weekend Return, with a lower discount but allowing travel Friday, Saturday or Sunday with return on Saturday, Sunday or Monday and targeted on short breaks and visiting friends and relatives (VFR)
- Monthly Return, the main holiday fare, still less discounted

- Standard Singles and Returns, with the return price at double the single, undiscounted and valid for three months

2.14 For short journeys, only the Standard Single and Return and Cheap Day Return were available, maintaining a simple and clear peak/off-peak structure which, with the addition of zoning and multimodality in conurbations, remains the standard structure for local trips.

2.15 The full structure, applicable to longer journeys, was more complex and less clear. The Cheap Day Return and Weekend Return generated additional demand but the latter often exacerbating crowding during the Friday and Sunday leisure peaks.

Railcards

2.16 In 1973 BR introduced the Student Railcard, later extended to all young people, who generally make leisure but not business trips, and have the time and desire to travel, but may be budget-constrained. Some Railcards are subject to weekday peak restrictions or minimum fares, and a Railcard price offsets some of the revenue reduction from abstracted trips. Railcards have since been introduced for:

- Young people aged 16-25, by extension of the Student Railcard
- Seniors, who mainly make leisure trips and have time to travel
- Friends and Family, for trips with children, in competition with car
- Disabled Persons
- Forces personnel
- The Network card for off-peak travel in the former Network SouthEast area
- The New Deal Railcard, administered by the Department of Work and Pensions, for the unemployed

Time-restricted fares

2.17 Deregulation in 1980 led to new coach services which started to erode rail's market share, and BR responded with Saver tickets offering a highly discounted return fare on selected trains where spare capacity was available. In 1985 Savers were introduced to all long distance flows, replacing all Weekend Returns and Monthly Returns and long distance Cheap Day Returns.

2.18 Savers, at two price levels which later became Savers and SuperSavers, moved from time-away to time of travel as a segmentation mechanism, with trains with a high level of business travel, and therefore dilution risk, barred to Savers irrespective of loadings. Saver restrictions were often defined as a list of permitted or restricted services, rather than the time bands used for Cheap Day Returns at short distances. The large differential between Saver and full fares often meant that the first Saver train was overloaded, particularly leaving London on Friday afternoon.

Advance purchase fares

2.19 In the late 1980s BR began to experiment with advance purchase fares using airline-style yield management techniques. The fares were available in limited numbers, for specific trains, to leave space for passengers who would pay more for the ability to book later or to have the flexibility to change trains. Advance purchase fares added were:

- Advance Return, at the Saver price but available on some shoulder peak trains on which the walk-up fare on these trains would be the Standard Open Return
- SuperAdvance Return, at the SuperSaver price but available on some trains barred to SuperSavers on which the walk-up fare would be the Saver
- Apex Return and SuperApex Return, priced below the SuperSaver and available respectively on off-peak and deep off-peak trains where the walk-up fare would be the SuperSaver

2.20 The aim was that, as in the airline industry, prospective passengers would be quoted a price for travel on a specific service and not have to navigate sets of restrictions. All advance purchase fares are now on a single leg basis, enabling the outward and return legs to be selected and processed independently. At any time only one advance purchase fare is available for each combination of origin, destination, class of travel and train.

Fares simplification

2.21 The divergence of fare names and conditions among the operators was complex and confusing, so in 2008 the industry adopted a standard structure with the following components on long-distance fares:

- Anytime, replacing the previous Open tickets
- Off-Peak
- Super Off-Peak (optional)
- Advance, covering all advance purchase fares

2.22 Short distance fares supplement each name with "Day" resulting in Anytime Day, Off-Peak Day and Super Off-Peak Day tickets.

The current fares structure

2.23 Table 2.1 shows the main ticket types in the current structure, broadly in descending order of fare, although First Advance fares can undercut Standard, season ticket fares per journey vary, and Railcards typically offer discounts across all Standard fares.

2.24 Figure 2.1 shows the distribution of adult Standard journeys and revenue to London by distance in three major bands:

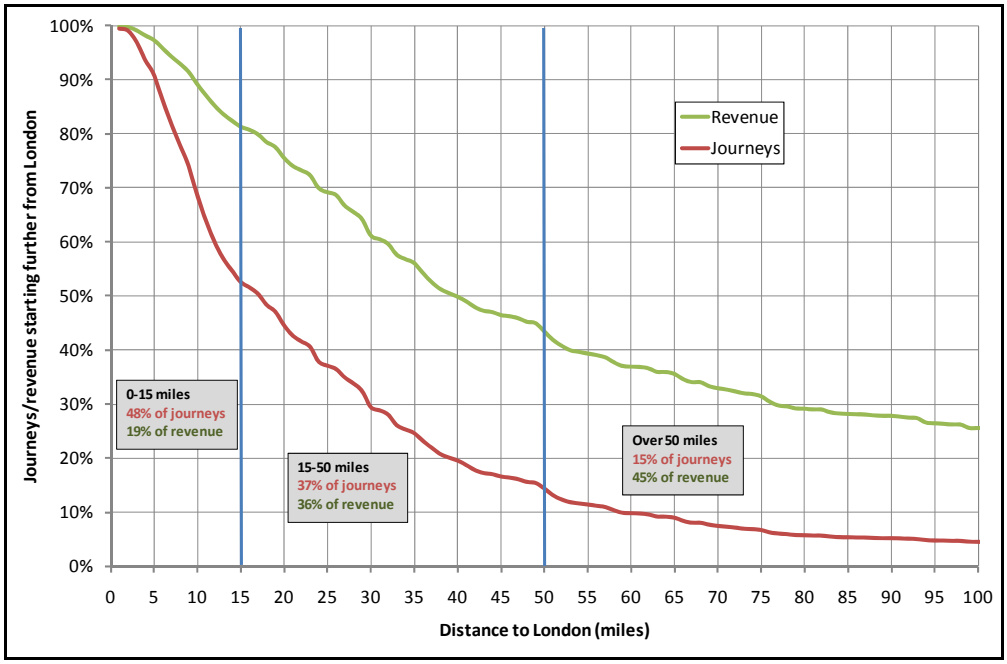
- Over 50 miles, accounting for only a sixth of journeys but nearly half of revenue and driving innovations such as advance booking and yield management discussed above
- Between 15 and 50 miles, accounting for over a third of both journeys and revenue, half of which is from season tickets
- Up to 15 miles, the Travelcard boundary, accounting for almost half of journeys, driving peak demand, but under a fifth of revenue, increasingly from fares structured and set by TfL in conjunction with the operators through the ATOC London scheme.

TABLE 2.1 SUMMARY OF FARES, 2010

Long distance		Short distance	
Single	**Return**	**Single**	**Return**
First Anytime		First Anytime Day	
First Advance			
Standard Anytime		Standard Anytime Day	
Standard Off-Peak		Standard Off-Peak Day	
Standard Super Off-Peak		Standard Super Off-Peak Day	
Standard Advance			
Season Tickets			
Railcard-discounted fares			

Source: Steer Davies Gleave analysis, see text

FIGURE 2.1 STANDARD JOURNEYS AND REVENUE TO LONDON BY DISTANCE



Source: Lennon data

The historic objectives of fares regulation

2.25 Railway fares regulation originated in the middle of the nineteenth century but formal regulation was abolished on the formation of the British Railways Board in 1962. Since then there has been a steady movement towards market pricing and innovations such as Railcards, Savers, Travelcards and Advance fares described above.

2.26 In the absence of formal regulation, government continued to influence fares increases in pursuit of two conflicting objectives:

- Pressure to minimise subsidy requirements
- Concern that commuter fares should not rise excessively relative to inflation

The current structure of fares regulation

2.27 Formal regulation was reintroduced following franchising, to meet the Franchise Director's duty to ensure that fares were reasonable.

2.28 Fares were related to the Retail Price Index (RPI) through the "RPI-X" regulatory system, in which regulated industries are required to return expected efficiency improvements to their customers by reducing real output prices by X% per annum.

2.29 The principal elements of regulation, imposed on franchisees through Schedule 5 of the Franchise Agreement, are as follows:

- Operators are required to participate in arrangements including Railcards and the acceptance of interavailable and through fares
- Regulation applies to adult and child Standard tickets but not First Class
- Regulation applies to both price and restrictions on two types of fare:
  - Initially regulated individually, covering weekly seasons and either Savers, where they existed in June 1995 or "the equivalent day ticket" (Tier 1 fares)
  - Initially regulated in fares baskets, as described below (Tier 2 fares)

2.30 Tier 2 fares baskets contained all flows by designated ticket type and area from which an operator gained revenue in a defined base year. For London, and with analogous arrangements for other major cities, this covered:

- Weekly, monthly, quarterly and annual seasons to and from the London Travelcard area

OPEN SINGLES AND RETURNS WITHIN THE LONDON AREA AND TO THE LONDON AREA FROM UP TO 50 MILES AROUND IT (SEE

- Figure 2.1)

2.31 For Tier 1 regulated fares, the maximum permitted January price increase was based on the cumulative effect of RPI to the previous July:

- RPI, from the three years 1996 to 1998
- RPI-1%, for the five years 1999 to 2003

2.32 For Tier 2 regulated fares, there was additional flexibility to vary individual fares within the basket by up to 2% above RPI each year.

The SRA Fares Review 2003

2.33 In June 2003 the Strategic Rail Authority (SRA) published its Fares Review identifying and formalising new objectives, reproduced in Figure 2.2, and setting out the changes that would apply from January 2004.

FIGURE 2.2 OBJECTIVES FROM SRA "FARES REVIEW CONCLUSIONS 2003"

The SRA also defined a set of specific objectives for its new fares policy:

- To protect passengers in markets where train operators have a significant degree of market power, for example on urban commuter routes
- To redress the balance between taxpayer and passenger, as increasing industry costs have so far been borne almost entirely by the taxpayer
- To allow more scope for innovation in fares and ticket types, allowing train operators to make better use of the capacity that is available
- To minimise the administrative burden on train operators by simplifying the processes and mechanisms used to regulate fares

2.34 Broadly speaking, the first pair of objectives relate to the concept of "fairness" or "equity", addressed by existing regulation and policy respectively, and the second pair aspire to further "efficiency" through better use of capacity and simpler administration.

2.35 Addressing the first objective, it was concluded that Standard weekly seasons and most common commuter fares around London would continue to be regulated.

2.36 Addressing the second objective, the overall price cap was changed from RPI-1% to RPI+1%, with individual fares permitted to rise by up to RPI+5%.

2.37 Addressing the third objective, innovation, the review questioned the regulation of Savers, which continued to create a spurious peak with significant overcrowding on some routes. It stated an intention to work with operators to address these problems, but Saver fares and restrictions continued to be regulated.

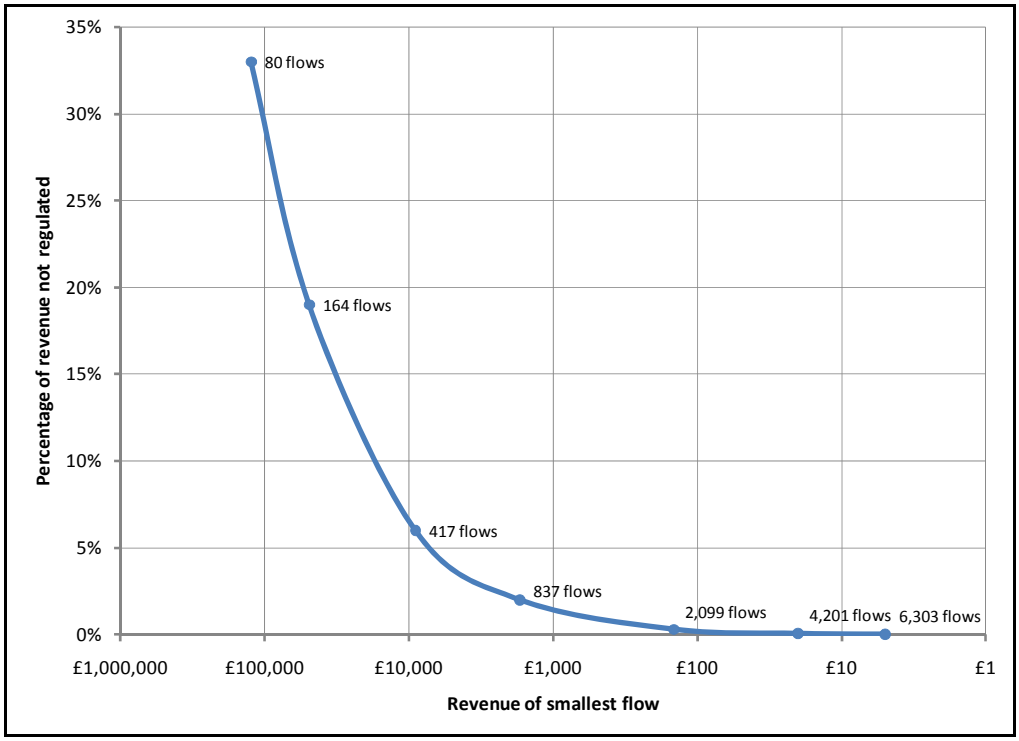
2.38 Addressing the fourth objective, simplification, the review concluded that all fares would be regulated through two baskets for each operator:

- A "commuter fares" basket containing Tier 2 fares
- A "protected fares" basket containing Tier 1 fares which had formerly been individually regulated

2.39 This conclusion was supported in part by an analysis of a typical London fares basket which we have reinterpreted as Figure 2.3.

2.40 In this example, tickets on 6,303 flows were sold in the previous year, but around 2,000 flows contributed 99.7% of revenue. The remaining 4,000 flows, none of them contributing more than £100, in some cases consisting of a single ticket, contributed only 0.3% of revenue. Even if they were regulated this might have no effect, as random variations in travel demand would mean that many of these flows might not see a single sale in subsequent years.

FIGURE 2.3 FLOWS IN AN ILLUSTRATIVE LONDON FARES BASKET, 2003



Source: SRA Fares Review 2003

2.41 Table 2.2 reproduces Table 2.1 and shows how the shaded regulated fares "quasi-regulate" other fares. Note that sometimes the Standard Super Off-Peak Return is the regulated Off-Peak fare.

TABLE 2.2 SUMMARY OF REGULATION, 2010

Long distance		Short distance	
Single	**Return**	**Single**	**Return**
First Anytime		First Anytime Day	
First Advance			
Standard Anytime		Standard Anytime Day	
Standard Off-Peak		Standard Off-Peak Day	
Standard Super Off-Peak		Standard Super Off-Peak Day	
Standard Advance			
Season Tickets			
Railcard-discounted fares			

Source: Steer Davies Gleave analysis, see text

2.42 Single fares cannot exceed return fares, Super Off-Peak fares cannot exceed Off-Peak fares, and Anytime and First Class fares can only exceed Off-Peak fares by the amount passengers are willing to pay to travel in the peak or in First Class.

Comparisons between countries

2.43 As part of our literature review in Appendix A we revisited previous research into "Comparisons between fares and ticketing in Britain and continental Europe", a study for Passenger Focus which reported in February 2009 and was directed and managed by members of our current study team. Further details of the study and additional analysis are provided in Appendix C.

2.44 The work focused on the August 2008 fares, service frequencies and service speeds of the railways of the eight largest economies in Europe, comparing Great Britain with France, Germany, Italy, the Netherlands, Spain, Sweden and Switzerland. Working only from public data on fares available in the market place, it produced a series of detailed comparisons of fares and other journey characteristics for a number of sample journeys in different distance bands. The study did not include:

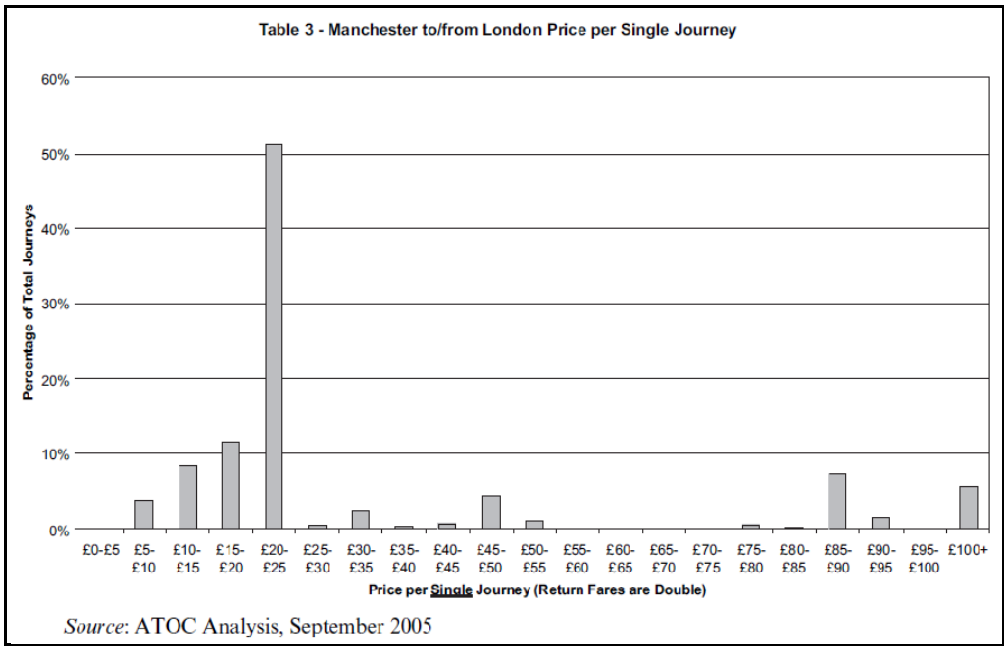
- Systematic comparison of average fares at an aggregate level, or of fares types.
- Sales or revenue data or a rigorous basis on which to estimate average fares or "yields" for the mix of ticket types actually sold in each country.
- Cost data, or any attempt to compare fares revenues with costs.
- Objectives or principles used to set national, regional and local fares.
- Other than London's Oystercard, identification or examination of smartcard technology in relation to any of the journeys studied.

2.45 The study also noted some of the underlying difficulties of comparing fares in different countries, including in particular:

- The choice of fares for comparison
- The treatment of differences in income levels and exchange rates

2.46 Figure 2.4 illustrates the issue of which fares are chosen for comparison.

FIGURE 2.4 FARES BETWEEN MANCHESTER AND LONDON, 2005



Source: ATOC analysis, September 2005, from Transport Select Committee 2006

2.47 Figure 2.4, presented in evidence to the Transport Select Committee in 2006, shows that the high Anytime fares which tend to be quoted in comparisons are paid only by a small proportion of passengers, the majority of whom benefit from cheaper Off-Peak or Advance fares.

2.48 Similar issues arose in examining the fares of Sweden, the comparator with the most liberal system of fares regulation. Former incumbent SJ has a monopoly on long-distance services and its fares are free from regulation. Long-distance fares are constrained only by interavailability with local fares specified by the counties, by competition with other modes, and by the price elasticity of demand. SJ makes extensive use of yield management, and fares for identical journeys vary by a factor of at least 7:1.

2.49 The February 2009 study's Executive Summary included the principal findings summarised in Table 2.3 below.

TABLE 2.3 FARES IN BRITAIN AND CONTINENTAL EUROPE, 2008

Summary of main findings on fares in Great Britain
Relative fares depend on terms and conditions of use: • Anytime long distance fares are significantly more expensive than elsewhere. • Anytime day return fares are among the highest in Europe. • "Walk-up" fares with some restrictions are more competitively priced. • Off-peak fares are often comparable to or better value than elsewhere. • Advance fares, especially to London, are among the lowest.
The variability of walk-up fares is highest: • London to Manchester differential of 3.5:1 between Anytime and Off-Peak returns.
The variability of advance purchase fares can be even higher: • London to Leeds differential of 10:1 between Anytime and cheapest Advance fare.
For long distance passengers: • Highest frequencies (London to Birmingham and Manchester has since risen to 3/hour). • Earlier arrival times and later departure times.
For London commuters: • Season tickets are significantly more expensive than to other European cities. • Highest frequencies. • Earliest first trains and latest last trains.

Comparisons between regions in Great Britain

2.50 We also revisited "Regional commuter fares and ticketing comparisons on Great Britain", a study for Passenger Focus which reported in January 2009. The study examined commuter travel to cities in different regions in three distance bands. It had no access to ticket sales or revenue data and hence no basis on which to estimate average fares for the mix of ticket types sold on each journey. In addition, the sample of London fares differed from that used in the European study described above. Further details of the study and additional analysis are provided in Appendix C.

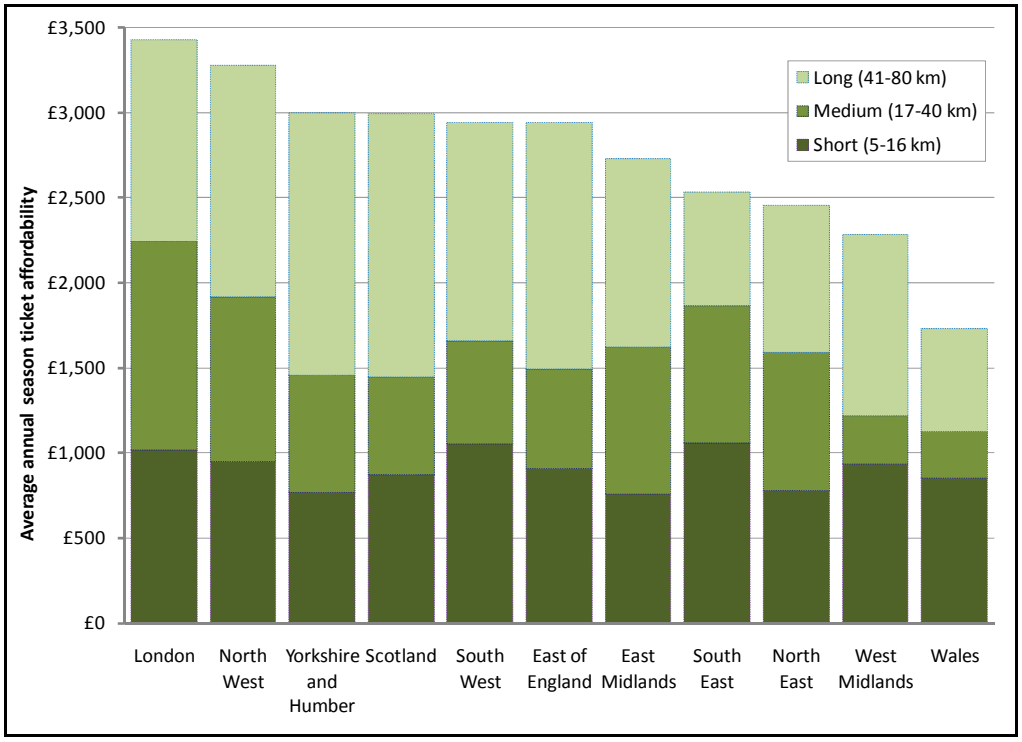
2.51 The principal findings are summarised in Table 2.4.

TABLE 2.4 RESEARCH ON REGIONAL FARES, 2008

Summary of main findings
Commuter fares: • London has the highest unrestricted commuter fares at all distances. • Non-London travel in the South East is cheaper than elsewhere.
Medium and long distance season tickets: • London has the highest fares. • Wales generally has the lowest fares.
Restricted fares: • Long distance fares to London are more expensive than elsewhere. • Short and medium distance fares for arrival 10:00 to 12:00 are similar everywhere.
Service frequency and length of service day: • London has more frequent service, at all distances, than other regions. • Services elsewhere are more limited, with a later start and earlier end.
Across the regions, average service speed is less variable than average frequency.

2.52 The study identified prima facie evidence of regional variations in the affordability of season tickets, which are illustrated in Figure 2.5 below. This suggests that season ticket prices are highest for commuting into London, but not to other places in the South East region, and lowest for commuting in Wales.

FIGURE 2.5 REGIONAL VARIATIONS IN SEASON TICKET AFFORDABILITY, 2008



Note: small sample, normalised for journey length and disposable income

Comparisons between modes

2.53 In Part One of the current study we carried out new research comparing, for cities in Great Britain and on the continent:

- Rail, bus and off-peak road journey times
- Rail fares, bus fares and motoring costs including and excluding parking

2.54 The comparison of rail fares, service frequencies and service speeds described above found that these were sufficiently consistent in each major city, whether in continental Europe or in Great Britain, to allow us to draw clear conclusions about international or regional differences.

Comparison of journey times

2.55 We found some consistency of patterns of rail and road journey time:

- At short distances in London, rail is on average twice as fast as car, but in other British cities this advantage is less and in some cases rail is on average slower than car.
- At equivalent distances, driving times in and to London, Europe's largest city, are consistently longer than to and in other principal European cities, for many of which car appears consistently faster than train.

2.56 We found no such consistency in bus journey times, which appeared to vary widely within each city, partly because in many locations bus does not directly compete with rail, whether in the deregulated bus market of Great Britain outside London or the integrated transport networks of many of the continental comparator cities.

Comparison of costs

2.57 Examination and comparison of rail, car and bus costs proved problematic. In central London alone, bus fares are standardised, but the cost of car travel depends on whether the congestion charge is payable, the cost of parking, which is free to some commuters but for others varies widely with location, and the number of people in the car. Some commuters within London may have access to free parking at their office but not at their local station, making parking a cost of rail travel but not of car travel. In regional cities, in contrast, there is no congestion charge, and often less variation in parking costs, but bus fares are less consistent between routes and operators.

2.58 The only consistent feature we have found in the cost comparisons is that short distance rail fares are often less than the cost of city centre parking, and in London are often less than the congestion charge. In most cases, this results in a conclusion that train is generally cheaper than car use, at least where there is a direct service between stations within walking distance of home and workplace.

2.59 Further details of this research are provided in Appendix C.

3 Effects of the Current Arrangements

Introduction

3.1 The structure of fares and the systems provided to regulate them have a number of strengths. BR gradually modified historic railway practice to introduce a range of market-facing fares which enabled it to obtain more revenue, and require less support, than would have been possible with the small and inflexible range of distance-related fares it inherited and which are still found in some countries. The privatisation structures put in place, and subsequently developed, have allowed further innovation, including heavily-discounted Advance fares, while maintaining objectives for, and a structure of, regulation to manage the overall process.

3.2 Nonetheless, fares and regulation have resulted in a number of undesirable effects which we review in this Chapter. We discuss in turn:

- The views of industry stakeholders, gathered through an interview programme
- Other issues raised in our terms of reference or identified in our literature review

Stakeholder views

3.3 We carried out interviews with a number of industry stakeholders, broadly categorised as "Regulators" or "Operators" as shown in Table 3.1, to explore their perspectives on the key issues affecting rail value for money.

TABLE 3.1 STAKEHOLDER INTERVIEW PARTICIPANTS

"Regulators"	"Operators"
Department for Transport (DfT)	Association of Train Operating Companies
Office of Rail Regulation (ORR)	Go-Ahead Group plc
Passenger Focus	Virgin Trains
Transport for London (TfL)	Stagecoach
Passenger Transport Executive Group	Northern Rail
Network Rail	

3.4 We also received a written submission from thetrainline.

3.5 Most interviews took the form of an open discussion lasting around an hour, using a guide listing the following topics:

- Fares structures
- Fares regulation/deregulation
- Objectives for regulation
- Revenue opportunities
- Costs
- Peak-spreading

- Ticket and Settlement Agreement (TSA)

3.6 While a topic guide was used as checklist, interviewees were allowed to drive the discussion from the perspective of their organisation. Discussions evolved as the research progressed, so that issues raised by one respondent could be examined further by others.

Summary of key points

Objectives of regulation and consequent need for regulation

3.7 Interviewees generally recognised that fares regulation is needed to avoid the abuse of market power. There is a consensus over the need to regulate fares for peak travel into London and other conurbations.

3.8 The wider objectives of regulation were acknowledged to varying degrees, with widest acceptance for supporting the economy and employment. Climate change and social inclusion were less widely recognised and seen as less important.

3.9 Views on the need for regulation outside this market varied widely, reflecting differing views on the objectives of regulation and the extent of market power held by the railways. Operators were largely in favour of greatly reduced regulation or deregulation off-peak, while regulators believe that rail still holds a powerful position in the market which could be abused.

Impacts of regulation

3.10 A key impact of regulation has been to maintain any historical anomalies in fares levels. The end result is that there is little consistency between price and demand, quality and cost. This means that the fares are not revenue- or volume-maximising and are also hard to understand. It has helped to maintain spurious peaks, and has limited operators' ability to manage demand.

3.11 A further effect of the inability to manage demand effectively is the need to cater for very high demand peaks, with consequences for the cost base.

3.12 Apart from fares regulation, many of the processes and structures in the rail industry are seen as a constraint on innovation, cost reduction, and the realisation of revenue generating opportunities.

Peak-spreading

3.13 Problems with the pattern of demand over the day are a significant constraint and are also quite variable. Three examples of the problems highlighted are:

- A "spurious" peak immediately after the official peak period
- A "super peak" within the official peak period, and a leisure peak at the beginning of the off-peak period
- Insufficient differentiation between peak and off-peak fares, leading to insufficient incentive for passengers to travel off-peak

3.14 It was generally believed that fares differentials of around 20-30% would be needed to make a difference. Even then, it would require a change in working patterns and is not something that should be seen in isolation within the rail industry.

3.15 Smartcards are seen to be one tool which is useful, or even a prerequisite, for tackling this issue.

Effects of off-peak deregulation

3.16 The effects of deregulating off-peak fares will depend on the operator's market position and views of elasticities. The most immediate effect is likely to be that operators would use the freedom obtained to improve the match between price and demand: that is, to increase prices where there is ample and growing demand, and to hold back prices where demand is weak.

3.17 The overall impact on fares levels depends upon the perspective: operators were much more likely to say that changes would (at least in the short term) be largely revenue neutral (but volume positive), whereas regulators were much more likely to be of the view that it would lead to significant overall price increases. Underlying this are fundamentally different perceptions of the level of competition faced by rail outside the peak travel to London market, where there is agreement that rail is dominant.

3.18 One specific effect could be the wider introduction of single leg pricing, which is seen as a way forward by at least some long distance operators.

One size does not fit all

3.19 An important underlying theme is that solutions need to be tailored to the circumstances of each operator: there was a consensus that there is no "one size fits all" solution. This implies that the solution is tackled at an individual franchise level, perhaps as part of the refranchising process.

3.20 This way a more holistic approach could be taken, with consideration of fares, costs and investment at the same time. The disadvantage is that it could put network benefits at risk.

Fundamental fares review

3.21 One other approach, seen positively by those with whom it was discussed, was to undertake a fundamental review of all fares and to "rebase" them to eliminate anomalies and perhaps to take into account quality and investment. Once done, this would make an RPI-X type formula practicable.

3.22 One interviewee suggested that there would be an advantage of introducing new fares in a "big bang" rather than incrementally, in that this would be more effective at influencing behaviour, such as encouraging a shift in regular travel times or working one day a week from home.

3.23 Appendix D contains a fuller list of stakeholder comments.

Other issues

3.24 Our terms of reference and our research raised a number of concerns about the current arrangements, including:

- The economic impact of current capped fares in peak and adjacent periods
- The practice of setting regulated fares from pre-privatisation levels
- Anomalies such as variations in the price per mile of different regulated fares

- The use of a single uniform fare cap rather than fares baskets
- Lack of reference to variations across routes of costs, crowding and quality
- Lack of incentives on season ticket holders to avoid peak periods
- The number and content of the fares baskets

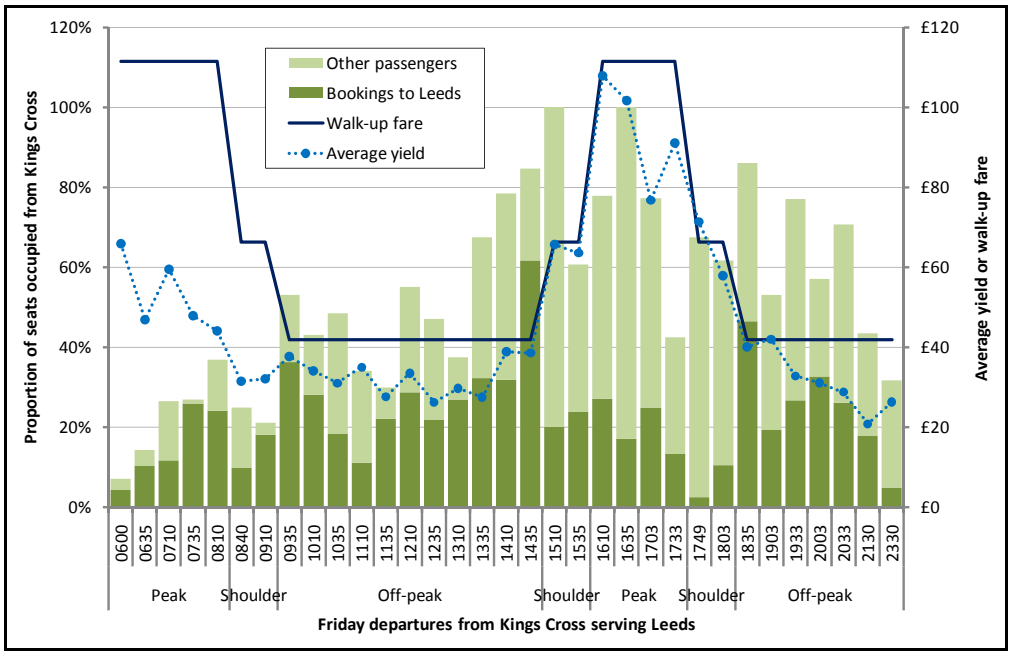
3.25 We discuss these in turn below.

The economic impact of current capped fares in peak and adjacent periods

3.26 As discussed in paragraph 2.18, it has long been known that the large differential between the regulated Off-Peak Return or Saver fare and Anytime Fares can mean that the first and last trains on which the former is valid can be overloaded.

3.27 Figure 3.1 shows the walk-up fare, average yield and pattern of advance bookings, on all ticket types, to Leeds in Standard accommodation on trains leaving London on Friday. It also shows other passengers including all "walk-up" demand and Advance tickets to intermediate destinations.

FIGURE 3.1 EFFECT OF OFF-PEAK REGULATION ON DAILY DEMAND PROFILE



Source: East Coast

3.28 Total advance bookings to Leeds are highest immediately before and after the PM peak, on the 1435 and 1835 departures on which regulated Super Off-Peak Returns are valid. Total loadings are also very high on these trains because all holders of Anytime, Off-Peak or Super Off-Peak tickets are entitled to board, and are subject only to the physical constraints on standing space.

3.29 These artificial peaks in demand result from the large differentials between Super Off-Peak, Off-Peak and Anytime walk-up fares shown by the solid blue line. The problem dates from the original BR Saver fare, which on this flow has become the regulated Standard Super Off-Peak Return, but has been exacerbated by the effects of real increases in the Anytime fare, which have been effective at shifting demand to the immediately adjacent trains. With an obligation to accept Super

Off-Peak tickets on the 1435 and 1835 departures, the only means the operator has to manage demand to capacity are to limit the number of points served by the most heavily-loaded trains and then to attempt to attract at least some passengers further into the off-peak through even greater discounts. Average yields in the off-peak, shown by the dotted line, can be well below the Super Off-Peak fare.

3.30 Even with this approach, which may reduce total revenue, total demand may exceed the seating and effective standing capacity of the train. Two further options for better management are introducing compulsory reservation, which would remove the "walk-up" availability of travel and implicitly result in rationing by time of booking, and increasing either the price or the restrictions on the regulated fare to spread peak demand more widely.

The practice of setting regulated fares from pre-privatisation levels

3.31 As Chapter 2 sets out, the levels of fares inherited from BR in 1995 followed several decades without formal regulation in which fares were gradually varied by region, route and flow in pursuit of market-related pricing. These fares were therefore neither wholly "fair" between different customers, nor revenue- or profit-maximising, nor determined by any other consistent guiding principle, and therefore, prima facie, are unlikely to form a rational starting point now for any of these approaches.

3.32 Depending on the weight given to different priorities, and in particular the extent to which fares are either to be standardised nationally in pursuit of "fairness", or to reflect local market conditions, there may in future be either a reduction or an increase in the variability of fares relative to current levels.

Anomalies such as variations in the price per mile of different regulated fares

3.33 We identify in Appendix B how fares on the West Coast and East Coast Main Lines differ for reasons originating in the pricing policies of different BR Divisions. As noted above, the relative levels of regulated fares embody not only differences inherited from BR but also any subsequent "drift" permitted to operators within the system of regulated fares baskets. The currently regulations impose no checks at all on how regulated fares for the same length of journey diverge between operators. Resolution of this "anomaly" as discussed above, may depend on whether the future focus of regulation is to be "fairness" or some measure of value or costs.

3.34 The industry may be concerned by anomalies such as geographical variations in the price per mile of regulated fares. Passengers, on the other hand, may not be aware of geographical variations, but are likely to perceive anomalies among the different fares available for a specific journey.

3.35 One anomaly is that the cheapest fare between two points may involve "split ticketing", buying two or more tickets for different parts of the journey. This can occur on a journey involving a single operator, such as where some unregulated London-Swindon fares are more expensive than the sum of the regulated London-Didcot and Didcot-Swindon fares. This may be resolved over time by the operator selectively pricing up the regulated fares to remove the anomaly.

3.36 However, split ticketing issues may also arise where a journey, for which there may be relatively little demand, involves one or more changes of operator. Little attention may have been paid to the through fare or its relationship with fares on each leg. Peak restrictions may apply on one leg but not another, or one or more operators may offer reduced fares on portions of the journey to stimulate local demand. None can be held individually responsible if a series of tickets proves cheaper than the through fare, and coordination by operators to avoid the creation of anomalies could be seen as anti-competitive and lead to referral to the competition authorities. The only effective means of removing these anomalies will be if exploitation of them becomes so widespread that it becomes impractical for operators to sustain through fares higher than the sum of the component parts. This may well happen as internet-based split ticketing tools improve and become more widely used but will, prima facie, result in a net loss of revenue.

3.37 A second anomaly is where a heavily-discounted ticket between two points undercuts fares for shorter journeys on the same route. Passengers may in principle not be permitted to "under-ride" and, if they board at a station after their ticketing origin, or alight at the one before their ticketed destination, they may be subject to an excess fare. It is difficult either to prevent passengers alighting before the ticketed destination or to explain that those boarding after the ticketed origin may be surcharged. This is one area in which increased use of new media may be helpful. Not only could passengers pre-loading a ticket onto a smartcard or mobile phone be specifically warned that it would not be accepted at intermediate stops, but ticket gates could also reject the ticket at intermediate stations where it was no valid. However, while prohibitions on under-riding may seem necessary to the industry to prevent loss of revenue, they may also seem bizarre and contrary to natural justice to passengers.

The use of a single uniform fare cap rather than fares baskets

3.38 The discussions above identify how the limited flexibility provided within the fares basket has allowed some current anomalies to be perpetuated, as with the differences between West Coast and East Coast fares, but may over time allow others to be eliminated, as with the anomalies in pricing between London, Didcot and Swindon. The future relative merits of a fares basket, and the alternative of restricting rises in each fare through a single uniform cap, will largely depend on the balance of regulatory priorities.

3.39 If the principal aim is to remove anomalies, or to allow operators gradually to refocus fares rises on inelastic markets from which they can steadily extract greater revenue, there may be a case for including all fares in a single regulated basket, as work at the Institute for Transport Studies, Leeds, examined in our literature review, has shown. If and when, on the other hand, fares have been optimised against regulatory objectives, and the requirement is to ensure that there is no further "drift" in regulated fares, then a single uniform fare cap may be appropriate.

Lack of reference to variations across routes of costs, crowding and quality

3.40 On a number of occasions in the past, investment in a particular route or corridor has been cited as a justification for rises in fares in general or, since privatisation,

in the cap applied to an operator's regulated fares basket. We discuss in Appendix B how Southeastern Trains' fares basket cap was set at RPI+3%, partly because of replacement of slam door rolling stock with newer trains.

3.41 In practice, where quality improves in a way valued by customers, their willingness to pay will rise. Unless regulated fares rise, operators will see an increase in demand, but in the case of unregulated fares they will in principle be free to decide whether to take the benefits as volume, more passengers at the same fares, or "yield", higher average fares for the same passengers. Conversely, as quality degrades over time, operators must implicitly either lower fares or lose passengers.

3.42 Establishing a more formal link between quality or investment and fares, or more specifically the cap on regulated fares, raises a number of issues relating to:

- The definition of the relevant fares basket
- The definition of relevant investment
- The definition of quality
- The appraisal of investment

3.43 The definition of the relevant fares basket would, ideally, be the regulated fares on those flows that would benefit from the investment, and could therefore require subdivision of an operator's existing basket into affected and unaffected flows. Further complications would arise on flows where investment by one operator would benefit passengers whose fares were set by another, or by another body, as within the London Travelcard area and some of the PTE areas. There could be perception of "unfairness" if the application of the regime appeared selective or capricious.

3.44 The definition of the relevant investment might also raise issues. Discussion tends to focus on the operators' provision of new trains, which might include associated expenditure in electrification, depots and stabling points. Infrastructure improvements such as line speed or ride quality might prove equally important, and demonstrably generate additional demand, but this would probably not be the case for investments in stations, tunnels or bridges. Fares would probably need to be linked to the perceived quality increase, if any, rather than the cash cost of investments which might be invisible to the passenger.

3.45 The definition of the quality of rail travel might include any or all of average speed, comfort and cleanliness of trains, reliability and punctuality, station facilities or, as a proxy for these or other factors, general customer satisfaction. Fares increases tend to have been linked to factors earlier in this list, and most specifically to investment in new trains and associated expenditure. However, the introduction of new trains does not, in itself, mean that passengers perceive a quality increase, an example being how some passengers prefer Mark III coaching stock dating from the 1970s to much newer stock. For the process to appear "fair", it might prove necessary to describe how refurbished trains would be treated, how the approach should be applied where a mix of stock operated on a route, whether passenger perceptions were to be taken into account, and whether fares should be lowered as trains gradually aged or, in some cases, were replaced with older stock. As with the now-abandoned FIAP regime linking fares to

performance, there would be a risk that such a scheme would require continual explanation of the basis on which fares were being adjusted up and down.

3.46 The appraisal of investment in rail projects almost invariably implicitly assumes that effects of higher quality are taken as additional passenger volume, generating external economic benefits which contribute to the overall scheme NPV. If some or all benefits are instead taken as additional fares yield, by a specific policy of raising fares after investment, revenue and hence cost-recovery will remain unchanged but, with fewer or no external benefits, the economic NPV of projects will fall. As a result, the number of projects which can be justified on the basis of economic appraisal will decline, resulting in a smaller investment programme.

3.47 In summary, while some past increases in fares following major investment have been presented as being linked to improvements in costs or quality, we are not aware of any examples in which such a calculation has been made or how it would address the issues discussed above. A formal link between investment or quality and fares could add confusion over how the regulated fares cap has been set.

Lack of financial incentives on season ticket holders to travel less in the peak

3.48 Season tickets and London area Travelcards allow unlimited travel between all points on all routes and modes on which they are valid. There is currently no incentive, other than crowding, for season ticket holders either to travel less frequently or in particular to avoid travelling on peak services. For such an incentive to exist there would need to be, as a minimum, an incremental price payable for any peak journey, even if all off-peak and potentially shoulder-peak travel remained free at the margin.

3.49 TfL's "pay as you go" (PAYG) fares, which we discuss in greater detail in Chapter 6, are based on a fare for each journey, which is higher at peak times, although the fact that the total daily price is capped means that no further financial effect is felt once the cap has been reached. Differential fares could be applied to other commuters in a number of ways:

- By consistent application of "pay as you go", with an additional charge for each journey, ideally with no daily capping and the removal, or at least pricing up, of "unlimited travel" season tickets. This would require an extension of "pay as you go" fares to areas currently outside the Travelcard area.
- By restricting existing season tickets to off-peak periods only, with an additional supplement for peak or shoulder-peak travel. While it would in theory be possible to issue paper "peak supplement" tickets, it would be desirable to take advantage of smartcard technology to collect the supplement automatically at the time of travel.
- By introducing distinct "peak" and "off-peak" season tickets, with the latter not valid at particular times of arrival in London. Off-peak seasons, which have been tested in the past, would provide an ex ante incentive to switch from peak to off-peak commuting, but might require additional arrangements to deal with occasional journeys in the peak, and would offer no incentives to holders of "peak" seasons.

3.50 The scope for change will be limited, in the short term at least, by technological factors including the interface with existing systems, and the need to design a

system which does not create opportunities for fraud or evasion. The effect on behaviour and revenue may prove complex, but we discuss our approach to modelling peak-spreading in Chapter 6.

The number and content of the fares baskets

3.51 The discussion above raises the issue of whether, if fares were to reflect local quality or investment, it would be necessary to redefine the regulated fares baskets around the services affected.

3.52 More generally, there may be scope for review of the number and content of the fares baskets, for example:

- To prevent operators systematically loading fares increases on one part of the basket, if this was undesirable
- To force a shift in the relative prices of different regulated products, and in particular the prices of season tickets relative to day tickets
- To include and force down off-peak and possibly shoulder-peak fares if necessary to impose and maintain differentials that encourage peak spreading

Stakeholder impacts

3.53 Stakeholders in the rail industry include a variety of organisations and groups of individuals from train operators to commuters, listed in Table 3.2 and Source: National Rail Trends and National Passenger Survey (NPS)

3.54 Table 3.3, which summarise the impacts on the current regulation on each stakeholder group. The groups are not mutually exclusive, and many passengers in particular will be members of different groups at different times.

3.55 Where possible we have estimated the revenue associated with each stakeholder group using revenue data from National Rail Trends and journey purpose data from the National Passenger Survey (NPS).

TABLE 3.2 STAKEHOLDER IMPACTS: PASSENGERS

Geography	Journey purpose	Specific impacts of current regulation	Size of market
Long-distance	Commuting	Long-distance season tickets currently offer good value on a pence per mile basis. No carnet product for long distance part-time commuters. No reward for travelling off-peak.	£350m
	Business	Anytime tickets are mostly not regulated and therefore peak travel is increasingly expensive.	£528m
	Leisure	Demand is subject to artificial peaks due to restrictions on regulated Off-Peak tickets. A substantial portion of off-peak tickets (around 40% on West Coast) are now Advance fares and therefore not directly regulated. Regulated Off-Peak fares are good value relative to Anytime tickets.	£1,350m
London and South East	Commuting	Good value season ticket products, costing as little as 1.5 Anytime Returns per week. High levels of crowding due to the inability of operators to manage demand through fares. No reward for travelling off-peak.	£1,550m
	Commuting	No carnet product for infrequent commuters.	Unknown
	Business	High Anytime fares in commuter basket areas.	£500m
	Leisure	Off-peak tickets are not part of the commuter fares baskets, leaving more scope for price increases. On some routes, Off-Peak fares have risen to the regulated Anytime.	£1,000m
Regional	Commuting	Good value season ticket products. Crowding due to the inability of operators to manage demand via fares. No reward for travelling off-peak.	£325m
	Business	High Anytime fares in commuter basket areas.	£100m
	Leisure	Off-Peak tickets in some commuter fares baskets limit the scope for large fares increases.	£500m
All	Commuting with flexible working hours	No discounted season for commuters who can or wish to travel off-peak.	Unknown
	Railcard holders	Railcards prices are maintained at low levels, giving increasing benefits over time.	£60m
Routes where rail has high market power		Current basket regulation enables operators to keep fares low where competition is strong and raise them where it is weak.	Unknown

Source: National Rail Trends and National Passenger Survey (NPS)

TABLE 3.3 STAKEHOLDER IMPACTS: NON-PASSENGERS

Stakeholder group	Specific impacts of current regulation	Size of exposure
DfT	Lack of flexibility to alter prices without compensating operators. Low yields in regions further reduce the business case for investment. Regular unwelcome publicity from RPI-X rises.	£5.2bn
Taxpayer	Substantial cost from support, in particular low season ticket prices resulting from regulation.	£5.2bn
Non-user	Significant decongestion benefits from relative attractiveness of peak season travel.	N/A
TfL	TfL and national rail fares constrain each other.	Unknown
PTEs	Political pressure to increase capacity but little or no scope for payback via revenue.	Unknown
Long-distance operators	Demand is subject to artificial peaks due to restrictions on regulated Off-Peak tickets. Regulation of Off-Peak tickets limits ability to apply appropriate yield management.	£2.2bn
London and South East operators	Limited ability to manage demand. The effective cap on peak fares limits ability to segment the market. Regulation of seasons limits possible rises on Anytime Returns.	£3bn
Regional operators	Fares revenues are often insufficient to provide incentives to invest in or expand capacity.	£0.9bn

Source: National Rail Trends and National Passenger Survey (NPS)

4 Possible Approaches to Setting Fares

Introduction

4.1 Before addressing the need for, and scope of, fares regulation, we discuss various possible approaches to setting fares. Only when the means by which fares are to be set has been determined is it possible to examine the scope and design of whether and how they should be regulated. Direct regulation may not even be necessary where:

- It is agreed that fares should be set by the market
- Incentives on operators ensure that fares remain at the intended levels
- Fares are quasi-regulated by other fares

4.2 Fares can be set according to a mix of three fundamentally different approaches: "value", "fairness", and "cost", which we discuss in turn below.

Value or market pricing

4.3 Prices for the majority of consumer goods are set by "value" in the sense that producers are generally entitled to charge what consumers are prepared to pay. Government intervention in this process is limited to two main areas:

- Where competition is possible, ensuring that it operates effectively, and in particular that producers neither exploit positions of monopoly nor collude in pricing.
- Where competition is not possible or inherently limited, by regulation, as a proxy for the effects of competition in an efficiently-functioning market.

4.4 From the abolition of formal regulation in 1962 to the advent of franchising in 1996, rail fares were determined by an informal mix of regulation based on historic fares and adjustments to reflect "value" where investment had taken place or passengers were able to pay more. Since then, as in other transport industries, the rail industry has taken advantage of opportunities:

- To segment the market so as to price discriminate, varying fares for the same journey with the estimated "value" to different customers
- To manage yields, allocating constrained capacity to the customers who value it most

"Fairness" or equity

4.5 Railway fares have always been subject to at least control or regulation, partly to address clearly-defined economic principles but in many cases to be seen to ensure "fairness" in a number of different areas.

4.6 Table 4.1 below illustrates how current regulation can be related to common perceptions of "fairness" in rail fares.

TABLE 4.1 APPLICATION OF "FAIRNESS" IN RAIL FARES

"Fair" relationship			Current regulation
Fares in Great Britain	Should be "about the same as"	Fares on the continent	
Rail fares		Fares for other transport	
Fares		"Costs"	
One region or route		Another region or route	Historic BR fares
One train or operator		Another train or operator	Interavailability
Future		Past	RPI-X regulation
Seasons, per journey	Should be less than	Singles, per journey	Seasons
Off-peak		Peak	Savers
Fares paid by "the poor"		Fares paid by "the rich"	Railcards
Standard		First Class	Quasi-regulation
Single		Return	
Short distance		Long distance	
Advance		Walk-up	

4.7 The first three items in the table have not in the past been formally taken into account in setting or regulating rail fares, but emerge frequently in public discussions of railway funding:

- A perception that rail fares in Great Britain are more expensive than elsewhere in Europe, which we examined above in Chapter 2
- A perception that rail fares are expensive compared with car travel, particularly if the perceived cost of the latter is only the cost of fuel
- An expectation that the price of goods and services, including rail fares, should be related to "cost", and that any major difference is unfair "profit"

4.8 There has, however, been intervention in a number of other aspects of rail fares which can be seen as addressing issues of "fairness" in a number of ways.

4.9 There is a public expectation that fares should be the same, or about the same, in different regions or on different routes. This is the underlying driver of the regulatory regime: fares which were already broadly similar were regulated on an RPI-X basis with the intention of allowing only small relative movements, at least in the short term. In the long term, however, the current system of regulation by fares basket allows a steady divergence of fares in different places.

4.10 There is similarly an expectation that at least some fares should be valid on any train and hence, by extension, on the services of any operator. This led to the requirement that certain fares are "interavailable" and accepted on the services of all operators, whether franchised or not.

4.11 In common with other regulated industries, there is a public expectation that future real fares should be lower than, or at least not materially higher than, past fares. As in other regulated industries, this initially led to RPI-X regulation with the value of X being set so that, on average, nominal fares rose by less than inflation. Public concerns over fares levels have tended to increase since 2003, when the SRA revised the regulatory formula to allow real increases in regulated fares.

4.12 There is an expectation that commuters regularly paying large amounts to the rail industry should be treated "fairly". This had led to the specific regulation of season tickets, by RPI-X, relative to levels immediately before privatisation. In London, this approach has been constrained by the Mayor's powers over fares within the Travelcard area.

4.13 The expectation that off-peak fares should be lower than peak fares has led, in long distance markets, to the regulation of the Saver, preserving a discount to the historic BR open fares from which Anytime fares have evolved.

4.14 While Railcards were originally introduced on a commercial basis, and may still be commercially viable, they have naturally led to an expectation that specific or vulnerable socioeconomic groups should have access to lower fares under certain circumstances.

4.15 Finally, a number of other aspects of "fairness" are achieved through quasi-regulation. Anomalies would arise, and be exploited, if:

- Standard fares were more than First Class fares
- Return fares were more than the sum of two single fares
- Short distance fares were more than long-distance fares
- Advance fares were more than walk-up fares available on the same train

4.16 We discuss in Chapter 5 that one possible approach to "fairness" would be to revert to a highly-standardised "posted-price" system of rail fares.

4.17 However, and as we noted in paragraph 4.7, there is also a wide public expectation that fares should not be unduly high relative to some measure of costs. In other industries, consumers are likely to cite measures such as the scale or existence of profit or, where the cost to producers of individual products or inputs can be identified, "mark-up" or gross margin.

4.18 One expectation transferred from other industries is that there is a "cost price", below which producers will not sell, but above which a large mark-up or margin is not reasonable. In Great Britain and other countries, the introduction of highly-discounted advance purchase fares has led to the assumption that these are "fair" prices which, if they can be offered to some passengers, presumably are at least equal to "cost" and should be offered to all.

4.19 This naturally leads to the assumption that fares should in some way be related to costs, which we discuss next.

Cost

4.20 Our terms of reference asked us to review, inter alia, fare levels relative to costs. With over 100 million different fares to consider, we have assumed that this means that we should seek to identify costing principles which might, as a minimum, provide guidance on how fares might vary:

- Between peak, shoulder-peak and off-peak
- With journey length
- Optionally, between different services groups and routes
- Optionally, with variations in quality and following new investment

4.21 However, setting fares for individual journeys, in relation to the "marginal costs" imposed by individual passengers, cannot be defined in isolation from the marginal change in service level being considered. For example, the cost of stopping to pick up passengers could be limited to the immediate cost of decelerating and restarting the train, which can exceed £100, or could include station staff or the cost of operating, maintaining and providing the station.

4.22 Even ignoring externalities, and the contribution of freight operations to costs and revenues, experience suggests that obtaining meaningful estimates of costs on this basis is rarely either undertaken or useful.

Past comparisons of costs and fares

4.23 The former Strategic Rail Authority (SRA) carried out a fares review, which reported in 2003. It summarised its attempts to make sure that "fares send efficient price signals", by being related to long run marginal costs, with the text reproduced as Figure 4.1.

FIGURE 4.1 EXTRACT FROM SRA "FARES REVIEW CONCLUSIONS 2003"

Estimating marginal costs for the rail industry is not straightforward, as long run marginal costs may differ significantly from their short run values. They will also differ between groups of passengers. A significant problem in calculating marginal costs for the rail industry is the high proportion of fixed, joint and common costs involved in providing a railway service. The marginal cost of carrying extra passengers is very small up to the point where all spare capacity is used up. At this point marginal costs of carrying an additional passenger can then be very large, as more track or train are needed. The SRA has concluded from its work so far that:

- Fares should reflect the long run marginal cost because of the long lead times involved in investment and the limited ability of passengers to respond to price changes in the short term – for example, by changing jobs, changing travel patterns or moving house.
- It is not practical to calculate and apply long run marginal costs for each type of passenger. The relevant unit for calculating marginal costs should be either an additional train service or the next increment in capacity.

4.24 The SRA went on to conclude that regulated fares may be significantly below their economically efficient level, below long-run marginal costs, and that the result of this was overcrowding.

4.25 More rigorously, it could be argued that peak fares should be based on short run marginal costs (SRMC) and components of:

- The long run marginal cost of existing capacity
- Negative externalities, of which the largest is likely to be the effect of crowding that peak passengers impose on each other
- Positive externalities such as road congestion relief

4.26 This approach would still leave the practical difficulties of estimating the level and structure of these fares. Identifying the average, marginal or incremental costs of a service group is of little help in defining the millions of fares it will offer.

4.27 In Appendix E we summarise our review of past attempts to compare the costs and revenues of railways and in particular in Great Britain.

Practical considerations of relating fares to long run marginal costs (LRMC)

4.28 Our experience and analysis suggests that attempts to calculate any "correct" levels of fares from long run marginal costs (LRMC) would prove highly problematic:

- It would require a major and intrusive industry-wide costing model considerably more complex than the existing Network Modelling Framework (NMF)
- The resulting total fares revenue could not be compared with either current fares revenue or total industry costs until the modelling was complete
- It would almost certainly generate results which varied widely with route and service group and from current fares
- Without many additional and essentially arbitrary assumptions, it would be silent on how the burden of recovering LRMC should be shared between passengers travelling different distances or in different directions through the same capacity constraint
- It would worsen demand management issues in locations where LRMC was below market-clearing prices (as a proxy for SRMC)

4.29 With the outcome unpredictable until the analysis was complete, it would almost certainly not be possible to commit in advance to implementing the results, even over a long transition period.

Practical options for relating fares to short run marginal costs (SRMC)

4.30 Our analysis has, however, identified a number of issues where change may be justified using modified SRMC principles which, unlike LRMC, can be targeted in advance at specific problems.

4.31 First, overcrowding, particularly to the point where passengers cannot board trains, is economically inefficient and provides a theoretical justification for raising prices to at least market-clearing levels, as a proxy for SRMC, at which all passengers willing to pay to join a train can be accommodated. This could be taken to mean that prices should rise wherever, relative to the current planning standards, there were Passengers in Excess of Capacity (PIXC).

4.32 This analysis suggests that the basis for increasing fares at peak times should be not a theoretical attempt to calculate some measure of marginal costs, but a

practical one of dealing with overcrowding by raising prices to market-clearing levels. Nevertheless, given the evidence of peak overcrowding and the expectation that peak travel demand will be relatively inelastic, we would expect that market-clearing pricing would lead to a substantial increase in the overall level of fares and hence of revenue. In these circumstances, passengers using peak services would be making a considerably higher contribution to costs than at present, although the fares paid would generally not equate to LRMC, strictly defined.

4.33 Second, by extension of the above, and given wide variations in load factor between commuter peak, shoulder-peak and off-peak services, there appears to be a basis for varying the broader structure of fares to achieve more balanced use of the capacity of trains or infrastructure. In some cases, this could mean both increasing peak fares and reducing off-peak fares to create a greater differential and encourage greater use of off-peak capacity.

4.34 There is, however, no prima facie reason why the application of economic principles, where based on LRMC or SRMC and market-clearing pricing, will ensure coverage of any given proportion of capacity costs. In general, the revenue outcome will depend on the capacity provided, and the level and elasticity of demand, in different markets.

4.35 This raises the question of how to secure significantly higher revenues while departing as little as possible from economically efficient fare levels. One possible solution, well established in the economics literature, is Ramsey pricing, whereby prices are set such that the mark-up over marginal cost is higher in markets with less elastic demand. This places the burden of raising additional revenue on markets in which demand is less responsive to changes in price, with the result that the resulting level of demand in different markets is as close as possible to the theoretical optimum. Applied to railway markets, this would mean train operators pricing over and above market-clearing levels in the peak and on routes where passengers had few if any alternatives to rail travel.

4.36 Under certain assumptions, tariff basket regulation of the kind already applied to franchised train operators tends to encourage Ramsey pricing, although the application of an RPI+1% cap to individual fares in January 2010 temporarily removed the flexibility needed to apply it. Further, research undertaken by the Institute of Transport Studies at Leeds University, and included in our literature review, has demonstrated that economic efficiency can be reduced if limits are placed on the ability of operators to set fares by reference to demand elasticities. This has important implications for fares regulation and for the consideration of fairness, as discussed in the context of options for regulatory change below.

4.37 As noted at the beginning of this Chapter, if changes of this kind are defensible or desirable in the short term, sufficient regulation should be put in place to ensure that they are not dissipated or distorted in the long term through regulatory drift.

Our proposed new objectives for fares regulation

4.38 We set out the history of fares regulation including, in Figure 2.2, the 2003 SRA objectives which we characterised as a mix of economic "equity" and "efficiency" approaches.

4.39 We propose a number of objectives for future fares policy, dealing in turn with:

- Protection from abuse of market power
- Contribution to the cost of providing peak capacity
- Encouraging efficient use of available capacity
- Minimising administrative costs
- Correcting for externalities in the wider transport system
- Fairness and vulnerable groups

4.40 Where relevant we discuss the rationale for departing from the SRA's position in 2003.

1 Fares regulation should protect passengers from abuse of market power

4.41 This objective, taken from the 2003 SRA objectives largely unmodified, reflects a recognition that the franchising system often enables train operators to enjoy a degree of monopoly power in at least some of the markets they serve, and that in these circumstances regulation is needed as a proxy for competition. The presumption is that the existence of market power provides a rationale for some form of fares regulation, recognising that this needs to be balanced with a wider set of objectives including raising peak fares to reflect capacity costs.

4.42 However, it is likely to be problematic either to use this objective to plan the level and structure of fares or to determine ex-post whether a system of fares regulation achieves it. A standard approach by competition authorities to the identification of abuse of market power is to investigate profit levels and to assess whether these appear to be excessive in relation to the nature of the business and the level of risk involved. Such an approach cannot be applied to rail franchisees, since excess profits are bid away in a competitive procurement process. The winning franchise may be charging individual fares that are above competitive levels but this will not be apparent from its profits since the associated economic rents will be passed on to the public sector through a higher premium or lower subsidy.

4.43 An alternative approach to the examination of profits could be to establish benchmark fares for different types of route, against which actual fares would be tested. A methodology would need to be devised for setting benchmarks, but could in principle distinguish some or all of the factors listed in paragraph 4.20 above. Given the wide variation in costs across the industry, however, there is a risk that application of such benchmarks would either remain only a general guide to the reasonableness of fares or converge with a deterministic regulation of individual fares based on a set of cost conventions.

2 Passengers using peak services should pay fares that reflect the costs of providing peak capacity

4.44 This objective could be invoked with the aim of ensuring that peak fares were in some way precisely related to costs, and in particular to some measure of long run marginal cost (LRMC).

4.45 As we set out above, however, rigorous application of LRMC pricing by route or service is impractical, and rigorous determination of whether such an objective had been met would be impossible.

4.46 With relatively limited cost analysis it should generally be possible to confirm that annual revenues from peak passengers exceed the short run marginal costs (SRMC) of operating their services, at least if externalities such as crowding are ignored. This would allow a statement that, in aggregate, peak passengers are making a contribution towards capacity costs, but would provide little information on the level or distribution of that contribution.

4.47 However, this formulation of the objective also raises questions about the definition of the peak. The analysis above suggests that it may be necessary to distinguish, as a minimum, the costs and revenues associated with peak, shoulder peak and off-peak capacity. Where capacity is constrained, it seems logical that it should be identified as being peak, or at least shoulder peak, and the objective would require that all passengers paid at least some premium relative to those travelling off-peak. Under these circumstances the objective might become difficult to distinguish from one of encouraging efficient use of available capacity, which we discuss below. Efficient pricing of the shoulder peak, including any times at which demand exceeded capacity, could result in a shift in demand both to the peak, with fares deemed to include a contribution to capacity costs, and the off-peak, in which such a contribution might, arguably, be explicitly forbidden.

4.48 This objective makes no reference either to "redressing the balance of demand between taxpayer and passenger", as in the analogous 2003 definition, or to the McNulty observation that "the overall cost has risen but income from users has not kept pace". While in principle it would be possible to make the balance of fare revenue and taxation in overall funding a specific objective, this would likely require a departure from efficient economic pricing, as conventionally defined, since there could be no guarantee that such pricing would deliver the required balance. Nevertheless, expecting passengers to make a significant contribution to long run capacity costs is consistent with an expectation of a higher contribution from fares revenue than at present.

3 The structure of fares should encourage efficient use of available capacity

4.49 This objective envisages a rebalancing of fares levels resulting in higher fares in the peak and shoulder peak, and potentially lower fares in the off-peak, with the aim of ensuring that demand does not exceed some measure of optimal capacity. It is consistent with the option of increasing fares for peak travel, including season tickets, and specifically with ensuring that passengers pay a higher price for travel at times when capacity is, or would otherwise be, constrained. It also allows for measures to address the problem of spurious peaks and to secure, or regulate to impose, lower off-peak fares to encourage spreading of demand. As noted in

paragraph 4.32, we consider that applying the pricing principle underpinning this objective would be likely to result in a substantial increase in the overall level of fares as well as a change in their structure.

4.50 In the 2003 formulation the objective of improved capacity utilisation was linked explicitly to fares innovation. Here, rather than being conditional on innovation, we propose that more efficient use of available capacity should be a freestanding objective at the heart of any redesign of the structure and regulation of fares.

4.51 As formulated here, Objectives 2 and 3 can be balanced when specifying the system of fares regulation. Objective 3 puts more emphasis on the short term, implying peak fares set to manage demand within capacity, rather than to be related to some measure of LRMC. Nonetheless, in most cases it should be possible to demonstrate that fares levels that are consistent with market clearing in the peak also generate revenues that make a contribution to capacity costs.

4.52 Note also that, as in the case of Objective 2, we have defined Objective 3 in terms of a pricing principle without reference to the balance of fares revenue and taxation in overall cost recovery. This again reflects our view that the level of fares revenue, and hence the level of subsidy needed to recover a given level of costs, follows from the application of prices which make efficient use of available capacity. If fare levels are to be rigorously based on economic principles, it is not appropriate also to aim for a specific balance of passenger and taxpayer contributions. However, given the evidence that many peak fares are currently below the level needed to contain demand within capacity, it seems likely that meeting Objective 3 would tend to reduce the burden on the taxpayer.

4.53 Finally, the wording of Objective 3, specifically the reference to "encouraging" efficient use of capacity, provides for some flexibility in its application to support consistency in fare levels over time. A strict application of SRMC pricing could result in relatively high peak fares when capacity was constrained but a sudden and significant fall after the delivery of new capacity to accommodate additional traffic. In theory, the provision of substantial additional capacity could relieve existing constraints to the point where economically efficient pricing implied little or no contribution to capacity costs, even in the peak. In our view, such a rigorous approach would not be appropriate, not least because of the need to sustain higher revenues but also to avoid sending highly variable and confusing price signals to passengers.

4 The system of regulation of fares should be designed to minimise the associated administrative burden on the industry

4.54 A similar objective was included in the objectives defined by the SRA in 2003. However, this formulation seeks to ensure that consideration is given to the administrative costs incurred by the industry as a whole rather than only those borne by train operators.

4.55 We referred above, however, to how the omission of some regulated fares from the regulated basket, and the flexibility provided within the basket, allows the relative levels of fares to drift over time as operators seek to maximise profits. Careful, and potentially burdensome, design will be needed to ensure that fares do not, over time, gradually become less consistent with the stated objectives.

5 The system of regulation of fares should allow for the correction of externalities in the wider transport system

4.56 We referred above to the presence of both positive and negative externalities in rail travel, but it would be difficult to define a system of fares regulation that took into account all possible interactions with other transport markets and the externalities to which they give rise. Nevertheless, rail fares policy can be an important means of addressing transport issues such as road congestion and carbon emissions. This objective seeks to ensure that regulatory interventions can be made, for example, to encourage mode shift or to address labour market failures.

6 The structure of fares should have regard to perceptions of fairness and the need to ensure that vulnerable groups have access to affordable rail travel

4.57 This objective is open to interpretation, not least because perceptions of fairness are likely to vary among passengers and between passengers and other stakeholders. In demonstrating why a given fares structure is considered fair, it will be important to identify explicit, and potentially quantitative, criteria for assessing fairness, which are likely to involve comparisons between fares structures and fare types. We noted above that passengers might expect, inter alia, fares levels to be comparable with those in other countries and consistent between regions, and advance fares and season tickets to be cheaper than walk-up and day fares. Consistency between regions, however, might be difficult to reconcile with local decision-making on fares levels, as in London and the PTE areas.

4.58 Notions of fairness might also encompass views on the need to protect vulnerable groups such as those with low incomes or the unemployed. This objective therefore allows for measures explicitly targeted at such groups, such as discounted fares enabling the unemployed to extend the search for employment over a sufficiently large geographical area.

4.59 Table 4.2 overleaf summarises our proposed new objectives and compares them with the objectives set out in "SRA fares review conclusions 2003" reproduced in Figure 2.2. In Chapter 5 we discuss a number of specific options for changes which might be adopted to further some or all of these objectives.

TABLE 4.2 SUMMARY OF PROPOSED OBJECTIVES FOR FARES REGULATION

	SRA fares review conclusions 2003	Our proposed new objectives
Fairness or equity		
Abuse of market power	To protect passengers in markets where train operators have a significant degree of market power, for example on urban commuter routes	1 Fares regulation should protect passengers from abuse of market power
Average cost recovery	To redress the balance between taxpayer and passenger, as increasing industry costs have so far been borne almost entirely by the taxpayer	
Fairness between peak and off-peak		2 Passengers using peak services should pay fares that reflect the costs of providing peak capacity
Fairness and vulnerable groups		6 The structure of fares should have regard to perceptions of fairness and the need to ensure that vulnerable groups have access to affordable rail travel
Economic efficiency		
Innovation	To allow more scope for innovation in fares and tickets, allowing train operators to make better use of the capacity that is available.	
Administration	To minimise the administrative burden on train operators by simplifying processes and mechanisms used to regulate fares	4 The system of regulation of fares should be designed to minimise the associated administrative burden on the industry
Allocation		3 The structure of fares should encourage efficient use of available capacity
Externalities		5 The system of regulation of fares should allow for the correction of externalities in the wider transport system

5 Options

Introduction

5.1 Before developing options to take forward for analysis, we briefly considered three approaches to setting the structure and level of fares, which we summarise below:

- Varying the X in RPI-X
- A standardised national fares system
- Complete deregulation of fares

Varying the X in RPI-X

5.2 We did not examine the issue of the value of X in the RPI-X regulatory formula. While it enables additional revenue to be raised by a single administrative decision, the McNulty review has already concluded (see Figure 1.2) that it is essentially a policy decision for Government.

5.3 We do note, however, that the RPI-X mechanism provides a potentially useful tool for managing changes in the level and structure of fares. In particular:

- Where fares are to be rebalanced, a transition could be managed with some regulated fares rising by no more than Y% per annum, and potentially others falling by no more than Z% per annum to maintain overall revenues, until the rebalancing was complete.
- Where fares are to increase, this could be subject to maximum increase of Z% per annum until the new level was reached.
- Where fares are to be deregulated, the cap could be increase by Z% per annum until this was no longer acting as a constraint on operator behaviour.

A standardised national fares system

5.4 It would in principle be possible to revert, over time, to a highly-standardised "posted-price" system of rail fares, with a defined revenue target and a published national system of distance-based fares and standard discounts for season, shoulder-, off-peak and return tickets and with Railcards. Once a transition period had been completed, many or all of the issues of fairness, anomalies and distribution effects raised in our terms of reference could be eliminated and it would be possible, within reason, to make the overall level of cost-recovery from the railways a direct policy input.

5.5 This approach is still common in many continental railways:

- Germany had, until relatively recently, a public tariff book for passengers and freight, although market forces made it increasingly necessary to define "special tariffs" which were a codified form of "what the market will bear", and hence gradually converged on market pricing.
- France's distance-based passenger tariff was included in the evidence to the 2006 Transport Select Committee.

5.6 A wholly-standardised system could be fine-tuned or relaxed in a number of ways to retain some features of the current system:

- First Class fares could be excluded.
- Fares discounts, or additional products, could be permitted where capacity was available and this would increase revenue but not undermine any differentials required to encourage peak-spreading.
- Fares increases could be permitted where it could be shown that services were overcrowded and that the increases were necessary to manage demand.
- Fares could be set at various levels to reflect "quality" or "investment" although, as we noted in Chapter 3, this raises a number of practical issues.

5.7 A standardised system could also achieve at least some of the objectives set out in our terms of reference (Figure 1.1), including:

- Raising total fares revenue, through a decision on a target income level
- Improving overall network utilisation, if fares were everywhere graduated from peak through shoulder peak to off-peak
- Eliminating anomalies

5.8 It might also require minimal regulation, once the level and structure of fares had been defined and the transition had been completed, although in practice it might prove necessary to subject both to regular review to take into account changing policy objectives and industry developments.

5.9 While presentable as "fair", this approach would, however, have a number of fundamental weaknesses:

- The need to define the fares to be charged, which would be at least partly arbitrary, as harmonisation would inevitably involve large elements of averaging across the system
- The creation of winners and particularly losers, and the need for a transition
- The loss of the extensive fine-tuning of pricing over time to local markets, and hence the loss of the additional revenue this has generated relative to a simpler system

5.10 More widely, such an approach would be likely to be structurally regressive as, whatever the overall levels of fares set, it would rebalance the burden of fares away from markets where willingness to pay has been shown to be high to those where it has been found to be low. Elimination in the regional variations in affordability of season tickets shown in Figure 2.5, for example, would almost certainly result in a net transfer of funding from poorer regions to richer regions.

Complete deregulation of fares

5.11 At the other extreme from a standardised system would be the complete deregulation of fares. In principle, it could also achieve at least some of the objectives set out in our terms of reference, including:

- Raising total fares revenue, in that there would be no restriction on operators' ability to maximise revenue

- Improving overall network utilisation, in that higher peak fares would almost certainly spread demand to fill shoulder peak and off-peak capacity
- Correcting anomalies, although it would not necessarily make it easier to find the cheapest fare, or combination of fares, for a given journey
- Reducing artificial distortions

5.12 It would also minimise or remove the need to specify the structure or level of fares and the need for an annual decision on the value of X in RPI-X. We note, however, that there is no prima facie reason to suppose that even the resulting profit-maximising fares would result in a self-supporting railway.

5.13 None of the stakeholders interviewed favoured complete deregulation of fares, which would address neither the distributional issues listed in our terms of reference, including the protection of vulnerable groups, nor the positive externalities resulting from mode shift from car, coach and air to rail. Accordingly we do not discuss it further.

Options considered

5.14 In the absence of a single objective driving either a completely standardised fares system or complete deregulation, the future system of fares and regulation will inevitably be a compromise, based at least partially on the current position and reflecting the weighting given to different objectives in different markets.

5.15 We therefore identified nine options for more limited change, each capable of addressing at least one of the objectives set out in Table 4.2, which are summarised in Table 5.1 below.

Option 1, peak-spreading

5.16 Peak-spreading is a form of demand management in which price is used to divert passengers from times when capacity is constrained to times when it is more available. The aim would be to allow passengers to select their travel time in response to price rather than crowding, which would be minimised. By making load factors more even across the peak period, additional "headroom" for growth would be created on high peak trains before further investment in rolling stock or infrastructure was needed.

5.17 Peak-spreading was identified as a key issue for this study and it was agreed that it would be analysed further in Part Two.

Option 2, the price taper on season tickets

5.18 High discounts for long distance season tickets originate from BR's fare setting, when there was little long distance commuting but a need to set a notional fare. In practice, passengers buying weekly seasons may have originally been those needing to make two trips per week, rather than daily commuters.

5.19 Since privatisation, explicit regulation of season tickets, at all distances, has encouraged commuters deciding where to live and work to expect that future fares will be at close to current levels. In this sense the current fares are a "ticking time bomb", encouraging commuters to take advantage of lower house prices outside the cities in the expectation that the real price of commuting will not change materially. Our analysis shows that these commuters may be travelling in the high

peak at fares not only below Anytime fares for peak travel but also below unregulated fares, set in the market, for off-peak travel.

5.20 The regulation of commuter season tickets was identified as a key issue for this study and it was agreed that it would be analysed further in Part Two.

Option 3, the Standard Off-Peak Return or "Saver"

5.21 The continued validity of the former Saver fare into the shoulder peak, particularly for PM peak departures from London, appears to contribute to a "spurious" peak in demand and can result in severe overcrowding. This continues in these markets despite extensive yield management and the use of advance purchase fares which are readily visible on the internet to a large proportion of potential passengers. Option 3 relates to how regulation of the Standard Off-Peak Return or Super Off-Peak Return in the long distance markets has created excessive demand in the shoulder peak, due to under-pricing relative to peak and/or off-peak.

5.22 Better management of shoulder peak capacity was identified as a key issue for this study and it was agreed that it would be analysed further in Part Two.

Option 4, regulating long-distance Anytime tickets

5.23 Regulating long-distance Anytime tickets was put forward as an option with two possible objectives:

- To demonstrate to passengers that fares for all journeys were subject to an consistent ultimate upper cap.
- In support of other options, if Anytime fares would no longer be effectively quasi-regulated by a lower regulated fare and some protection against excessive rises was considered necessary.

5.24 In the event we agreed not to examine this as a standalone option but would consider it as part of other options if it appeared necessary to support them.

Option 5, single leg pricing

5.25 Single leg pricing has effectively been implemented within the Travelcard area through PAYG, and the majority of Advance fares for longer-distance journeys are priced as single legs. Additionally, and in the absence of information on the interaction between travellers' AM and PM journeys and the structure of return fares, many models of fares, including the peak-spreading and Saver deregulation models reviewed in Appendix A and used to examine Options 1 and 3, implicitly assume that fares are priced as single legs.

5.26 However, for the large proportion of flows not covered by PAYG or Advance tickets, the cheapest tickets are still returns. This means that replacement of all returns by single leg pricing would have an effect over and above those of peak-spreading and Saver deregulation.

5.27 Our proposal was to use National Rail Travel Survey (NRTS) data to understand the relationship between the timing of outward and return legs using return fares. Unrestricted return tickets are often bought when only one leg, particularly that in the AM peak, is restricted, so single leg pricing may reduce total revenues unless the prices for each leg rise.

5.28 If this relationship could be understood, analysis of the impact of single leg pricing could be through applying a relatively a simple elasticity-based approach to data on demand (LENNON) and the profile of departure times. This would focus on specific corridor case studies, from which we would extrapolate to national totals.

5.29 In the event we agreed not to examine this option.

Option 6, Railcard discounts

5.30 The industry's Passenger Demand Forecasting Handbook (PDFH) reports price elasticities of demand for journeys by Railcard holders, based on market research into abstraction and generation. These suggest that the 16 to 25 Railcard and the Family and Friends Railcard generate net travel revenue but the Senior Railcard does not. However, the elasticity of demand to the price of the Railcard appears to be low, so it seems likely that there would be scope to increase revenue, at least as a one-off effect.

5.31 One specific option might be to reduce the Railcard discount from 34% to 30%, an anachronism originating in the APTIS ticket machine, which could discount only in steps of one percent and hence not by one-third. It is arguable that reducing the discount to 30% would have little impact on demand but result in up to 6% increase in Railcard travel revenue.

5.32 Our proposal was to examine modifications to the Railcard discounts with a relatively simple approach of applying existing overall price elasticities of demand to existing demand data (LENNON) describing current Railcard sales and use. If possible we would also make use of work, undertaken for ATOC by the MVA Consultancy, which included recommendations to fine tune the Railcard products.

5.33 In the event we agreed not to examine this as a standalone option.

Option 7, products for part-time commuters

5.34 Tickets are currently offered for daily and weekly travel but not for travel at intermediate frequencies. In principle there may be an opportunity to raise additional revenue by devising a product, such as a carnet of tickets, targeted at this market.

5.35 In the event it would be premature to assess such an option before first reaching decisions on peak-spreading (Option 1) and the price taper on season tickets (Option 2), both of which would affect the trade-offs between commuting patterns and ticket types, and also the extent to which smartcards would simplify the provision of features such as pay as you go, carnets, or a volume-related discount.

Option 8, an absolute fares cap by ticket type

5.36 This option would address two issues, the Objective 6 issue of "fairness" between regions and routes and other anomalies discussed in paragraphs 3.33 to 3.36. We described, but did not consider further, the option of a standardised national fares system. A more limited change would be to modify the RPI-X mechanism to allow fares on flows with low yields to be increased faster than others, at least up to a standardised cap on each regulated fare at any given distance.

5.37 We agreed to examine this option, which could subsume both Option 2, higher long distance season ticket fares, and Option 3, higher Off-Peak Return fares, and increases in other regulated fares.

Option 9, the composition of the fares basket

5.38 Each franchised operator currently has at least one "basket" of regulated fares. Changes to the composition of the fares basket would be needed to implement some of the Options described above, allowing fares in one part of the basket to be increased at a higher rate than the overall RPI-X formula.

5.39 We agreed to examine how changes to the composition of the basket alone could influence the operators' ability to increase revenue or pursue other objectives.

TABLE 5.1 OPTIONS CONSIDERED

Option		Rationale and potential effects
1	**Peak-spreading**	**In London and other urban areas, enforced 2- or 3-tier pricing of travel to redistribute demand between high, shoulder and off-peak. Peak and probably shoulder peak fares would need to rise, and re-regulation might be required to make off-peak fares fall**
2	**The price taper on season tickets**	**Making season ticket fares more proportional to distance travelled and reducing the discount compared to other fares offered at longer distances**
3	**The Standard Off-Peak Return**	**Review of the pricing, availability and regulation of shoulder-peak "walk-up" fares which fail to contain demand within capacity**
4	Regulate long-distance Anytime	Extension of Anytime regulation might be necessary or desirable to support higher or deregulated Standard Off-Peak Returns or higher long distance season ticket prices
5	Single leg pricing	Regulating a Standard Off-Peak Single instead of the Return could simplify fares selection and improve incentives to travel in the deeper off-peak on at least one leg of a return trip
6	Railcard discounts	Railcards could be made more expensive, students and other young people could be separated, or the discount associated with them be lower or limited to a smaller range of tickets
7	Products for part-time commuters	Where pay as you go is not appropriate, new products intermediate between Anytime Day and season fares may generate revenue and help manage demand
8	**An absolute fares cap by ticket type**	**Introduction of a national distance-based cap on one or more types of regulated fares could allow the removal of anomalies**
9	**The composition of the fares basket**	**Contraction, expansion or subdivision of the fares basket may be necessary to implement or to retain the effects of other options**

5.40 We outlined these options briefly to our client on 16 December 2010 and provided further detail of the concepts on 20 December in our Report of Part One. At a review meeting on 21 December the study steering group agreed that we would carry out a quantitative analysis of the options shown in bold.

Options not analysed

5.41 Table 5.2 summarises an indicative qualitative assessment, against our proposed new objectives for fares regulation, of the options excluded from our quantitative analysis.

TABLE 5.2 OPTIONS NOT ANALYSED: INDICATIVE ASSESSMENT

Option	4	5	6	7
	Regulate long-distance Anytime	Single leg pricing	Railcard discounts	Products for part-time commuters
Performance against our proposed new objectives for fares regulation				
1. Protection from abuse of market power	Better	Better	Similar	Better
2. Peak fares reflect the costs of peak capacity	=	Better	=	?
3. Encouraging efficient use of available capacity	=	Better	=	Better ?
4. Minimising the administrative burden	Worse	Mixed	=	?
5. Correcting for externalities elsewhere	?	?	?	?
6. Fairness and protecting the vulnerable	Better	Mixed	Worse	Better

5.42 All of the options might address at least some of the objectives although:

- Option 6, reduction in the Railcard discounts, is the only option which would be almost certain to generate additional revenue, at least for the Senior Railcard.
- Option 5, single leg pricing, is the only option which would be almost certain to reflect the cost of peak capacity better, by enabling operators to send distinct price signals for each half of a return journey.

Options analysed

5.43 Our quantitative analysis in Part Two focused on the five options shown in bold in Table 5.1.

Data collection

5.44 The options vary in the complexity not only of their specification but also of the data and models required to examine them. In Part One we carried out considerable preparatory work on some, including peak-spreading, but were still developing our thinking on how, and in some cases whether, others could be examined with the available tools.

5.45 Our preparatory analysis focused on travel to and from central London, which was the subject of much of the work examined in our literature review, accounts for a much larger volume of travel and revenue than other cities, and has the most developed smartcard system in the form of Oyster. Where possible in Part Two, we also collected data to extend the analysis to other cities or nationally.

Enabling technologies

5.46 Implementation of some options might require, or benefit from, emerging or expanding technologies including:

- Proprietary standards for issuing tickets through the internet (e-ticketing) or via mobile phone (m-ticketing), already offered by some operators, and potential extensions to deal with ticket changes, refunds and seat selection.
- National standards, such as the Integrated Transport Smartcard Organisation (ITSO) standard for smartcard ticketing.
- European standards, such as the Telematic Applications for Passenger Services (TAP) Technical Specification for Interoperability (TSI) being developed to provide a common reservation, payment and ticketing system across Europe.

5.47 Given the general rate of technological progress, developments in all of these areas by the end of CP5 will almost certainly have gone beyond current relatively short term goals. As examples of the rate of progress in this area:

- On 19 January 2011 DfT stated, in its Local Transport White Paper "Creating Growth, Cutting Carbon", that it is committed to delivering, with operators and public sector bodies, the infrastructure to enable most public transport journeys to be undertaken using smart ticketing technology by the end of 2014
- On 14 February Nexus, the Tyne and Wear Passenger Transport Executive, launched a new smartcard, Pop, to be rolled out across the region during 2011
- On 24 February 2011 TfL announced that card readers across the whole network will accept payment by contactless bank or credit card by the end of 2012

5.48 For present purposes, we note that all the principal technological steps, such as collecting fares by touch-in and touch-out, or issuing reservations to a mobile phone, have already been proven in at least one application. The issue for our options is more likely to be one of agreement and design, and coordination of implementation, across a number of industry parties, than any enduring limitation of the technology.

Further analysis

5.49 We discuss each of the options analysed in turn in Chapters 6 to 10.

- Chapter 6, Option 1, peak-spreading
- Chapter 7, Option 2, the price taper on season tickets
- Chapter 8, Option 3, the Standard Off-Peak Return or "Saver"
- Chapter 9, Option 8, an absolute fares cap by ticket type
- Chapter 10, Option 9, the composition of the fares basket

6 Option 1, Peak-Spreading

Introduction

6.1 Peak demand is currently matched to the available capacity by crowding. Passengers are deterred from travelling at their preferred time first by lack of a seat, then by increasingly crowded standing room, and finally, in some cases, by an inability to board the train. Like "rationing by queue", this is economically inefficient, as it allocates capacity not to those who value it most, in exchange for payment which can be used to invest in new capacity, but through imposing the irrecoverable costs of crowding on all passengers.

6.2 Peak-spreading is a form of demand management in which price is used to divert passengers from times when capacity is constrained to times when it is more available. The aim of peak-spreading fares would be to allow passengers to select their travel time in response to price rather than crowding, which would be minimised. By making load factors more even across the peak period, additional "headroom" for growth would be created on high peak trains before further investment in rolling stock or infrastructure was needed.

6.3 Peak-spreading is widely applied by profit-maximising domestic and short haul airlines with frequent services, with higher prices on flights where demand is expected to be high relative to capacity. If correctly applied, this can result in both higher revenues and efficient use of capacity through a consistently high load factor on all flights. Similar demand management techniques are used by hotel and tour operators and ferry companies, and by rail operators selling advance purchase tickets tied to a specific service.

6.4 Peak-spreading raises different issues when applied to urban rail commuter flows, which normally operate without reservation systems or even identifying which service a passenger boards. Peak-spreading could mean:

- At its simplest, a system with peak and off-peak fares valid at different times, which may provide some incentive not to travel in the peak, but does not address the distribution of demand within the peak period.
- At its most complex, a system in which fares vary in small steps with the exact location and times of entry and exit to the system. Implementation of such a system would almost certainly rely on smartcards to calculate the price for each individual journey.

6.5 In our analysis we have assumed that the primary objective of peak-spreading fares would be to match demand more closely to capacity, at least during high peak and shoulder peak periods, if necessary supported by additional capacity in the shoulder peak. By implication, this would mean focusing on our Objective 3 "The structure of fares should encourage efficient use of available capacity".

6.6 Peak-spreading requires active management of the structure and level of fares to achieve an operational objective, rather than to "leave things to the market" or solely to raise revenue. It would not only mean tight control of high peak and

shoulder peak fares but also potentially the re-regulation of off-peak fares within the peak-spreading area, as we discuss below.

Literature review

6.7 The most recent and comprehensive study of the scope for peak-spreading is "Demand Management Techniques – Peak Spreading" by Faber Maunsell for DfT, TfL and Network Rail. We examined their April 2007 report as part of our literature review and subsequently received updated work on 17 December 2010.

6.8 Faber Maunsell carried out a literature review, covering some documents we have also re-examined, surveys of passengers and business, and stated preference work to identify the importance attached by passengers to crowding, standing, displacement of their travel from their preferred time, and changes in fare. They then developed a model in which the utility of arrival in different half hour time bands from 07:30 to 10:00 was a function of generalised time, fare, crowding levels and time displacement.

6.9 The model was used to estimate how passengers would respond to fares varying with time of travel in three corridors:

- London Waterloo, the South Western Main Line (SWML)
- London Paddington, the Great Western Main Line (GWML)
- Birmingham New Street, with service groups to Coventry and Wolverhampton

6.10 Tests assumed that passengers would be subjected to combinations of:

- Fare surcharges of 25% and 50% when demand exceeds capacity
- Fare discounts of 25% and 50% before and after demand exceeds capacity

6.11 The extremes of these tests, with some fares surcharged by 50% and others discounted by 50%, would result in a 3:1 range in fares, still relatively small compared with the range in long distance fares such as those to Manchester shown in Figure 2.4, the highest and lowest of which are unregulated.

6.12 In each case, the model simulated the demand between half-hour time periods in response to differences in the disutility of travel, iterating until at or near an equilibrium, and no passenger could benefit from changing his or her time of travel.

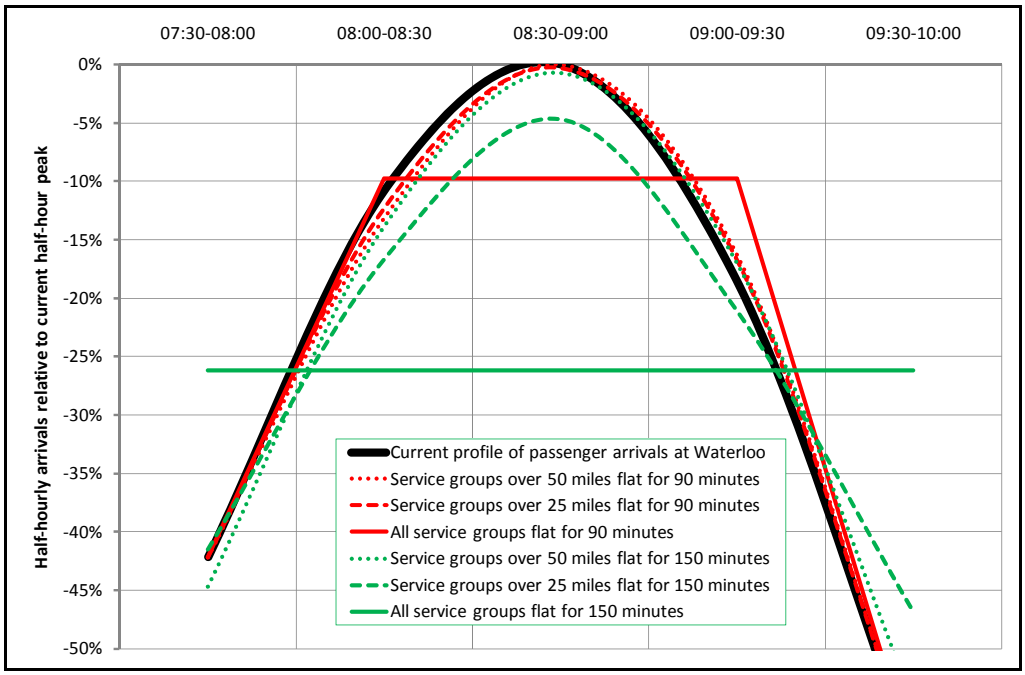
6.13 The principal reported outputs were the resulting changes in average load factors of trains arriving in each 30-minute period. On the basis of the limited primary research that they were able to carry out for the study, Faber Maunsell concluded that, inter alia:

- Significant percentage changes in fares would be needed to persuade passengers to change their arrival time.
- A combination of higher capacity, peak fare surcharges and shoulder peak fare reductions would be needed to produce behavioural change.
- Those most able to adjust their travel in response to fare differentials would be those with flexibility of travel time, who were likely to be high income.

Our analysis

6.14 Figure 6.1, based on data in Faber Maunsell's report, expresses the rate of passenger arrivals at London Waterloo relative to the number in the busiest half hour, from 08:30 to 09:00. We estimated how demand in this busiest half hour could be reduced by assuming that demand could be flattened over a period of 90 or even 150 minutes in service groups extending beyond 50 miles, beyond 25 miles, or including all service groups.

FIGURE 6.1 INDICATIVE EFFECTS OF PEAK SPREADING INTO WATERLOO, 2007



Source: Faber Maunsell, 2007, reanalysed by Steer Davies Gleave

6.15 The dotted and dashed red lines show that the effect of flattening arrivals for 90 minutes on service groups extending beyond 50 or even 25 miles would reduce the maximum half-hourly demand by less than 1%. If shorter distance services were included, as shown in the solid red line, total demand in the peak could be reduced by around 10%.

6.16 The dotted and dashed green lines show that the effect of flattening arrivals for 150 minutes on service groups extending beyond 25 miles would reduce the maximum half-hourly demand by nearly 5%. This would in theory change to over 25%, shown by the solid green line, if all service groups were included.

6.17 This simple analysis does not take into account a number of factors:

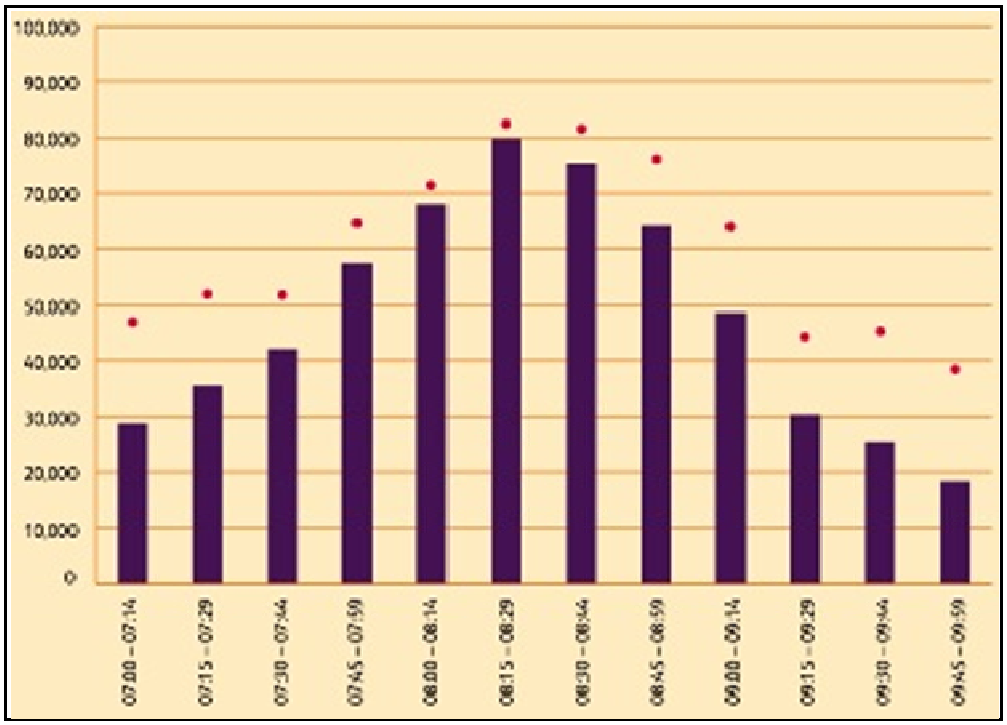
- The effect, which Faber Maunsell modelled but which is for simplicity ignored in Figure 6.1, of higher fares in the high peak making some peak passengers either not travel or switch to other modes.
- The effect, which Faber Maunsell acknowledged but did not model, of lower fares in the shoulder peak attracting new travel, transfer from other modes, and transfer from the off-peak.

- The capacity of shoulder peak services which, as Faber Maunsell noted, declines outside the peak half hour.

The need for shoulder peak capacity

6.18 The limited capacity currently available in the shoulder peak is clearly shown in Figure 6.2 below, reproduced from Network Rail's "London and South East Route Utilisation Study Draft for Consultation" published on 16 December 2010.

FIGURE 6.2 OVERALL LONDON CAPACITY AND DEMAND, 2008



Source: Network Rail London and South East RUS, December 2010

6.19 The blue bars show total passenger demand and the red dots show the total capacity provided by the current train service, which falls considerably outside the peak around 08:30. It would not be possible to flatten the existing demand peak much before additional rolling stock was needed to extend the period over which the high peak capacity was provided.

6.20 Nonetheless, we estimate that if average load factors were constant over the busiest five 15-minute periods, from 07:45 to 08:59, average peak demand could be reduced by at least 5%, although the exact reduction possible would vary between corridors.

6.21 This additional capacity "headroom" could potentially be gained by peak-spreading alone, without any expenditure to increase shoulder-peak capacity. In principle it would probably also be possible to increase shoulder peak capacity to that of the 30-minute "high peak" over a period of 90 minutes or more. Estimating the costs of additional rolling stock, and any associated train crew, cleaning and maintenance staff and depot and stabling facilities, is beyond the scope of this study.

6.22 In theory, it would be possible to forego the benefits of reduced high peak crowding, and instead to reduce high peak capacity and hence operating costs. In practice, it would probably not be possible either to implement, or to realise material savings from, reductions of high peak capacity equivalent to less than one vehicle on each high peak train. Indeed, additional rolling stock might be needed to expand shoulder peak capacity.

6.23 In addition, we assume in our assessment that sufficient capacity will be available to handle the forecast growth in demand over the period to the end of CP5, implicitly including some investments in rolling stock and/or infrastructure not yet committed or possibly not yet even identified. If demand is constrained by lack of capacity, then it may not be possible to obtain all the estimated incremental revenue.

6.24 The principal benefit of reduced high peak demand would therefore be to carry more passengers within existing levels of crowding before requiring further expansion of the infrastructure. A 5% reduction in peak demand might typically allow deferral of infrastructure investment to expand capacity by around two years, but identification and quantification of the potential savings is beyond the scope of this study.

6.25 Network Rail[3] provided a number of comments on our analysis, suggesting that:

- The scale of the reduction in peak demand is unlikely to make it possible to delay or avoid infrastructure works at major constraints (for example, the throat of London Waterloo), as the timing of these works is generally determined by life expiry of assets (particularly signalling) rather than by the level of passenger demand
- In at least some cases there would be a need for additional rolling stock in the shoulder peak, and hence potentially further operating costs such as train crew, cleaning and maintenance staff and infrastructure costs such as depot and stabling facilities

The need to include short-distance passengers

6.26 Both Faber Maunsell's detailed modelling and our simplified illustration show that there would be little effect on peak demand unless fares differentials applied to at least some passengers in short-distance service groups.

6.27 In London, many of these passengers travel wholly within the area in which fares are set jointly by Transport for London (TfL) and the operators and collected through the Oyster smartcard system. We therefore examined the TfL fares system with the aim of identifying:

- How the structure and level of TfL fares would constrain the design, operation and benefits of a peak-spreading system confined to passengers using national rail tickets
- What features of the structure and level of TfL's fares appear to be necessary or desirable in any peak-spreading system

[3] On 2 February 2011

The effects of Transport for London's fares system

6.28 TfL's fares are now based on six concentric fares zones, extending to nine in the north west, numbered from central London (Zone 1) to Amersham (Zone 9), 24 miles from London. Passengers can pay their fares by two means:

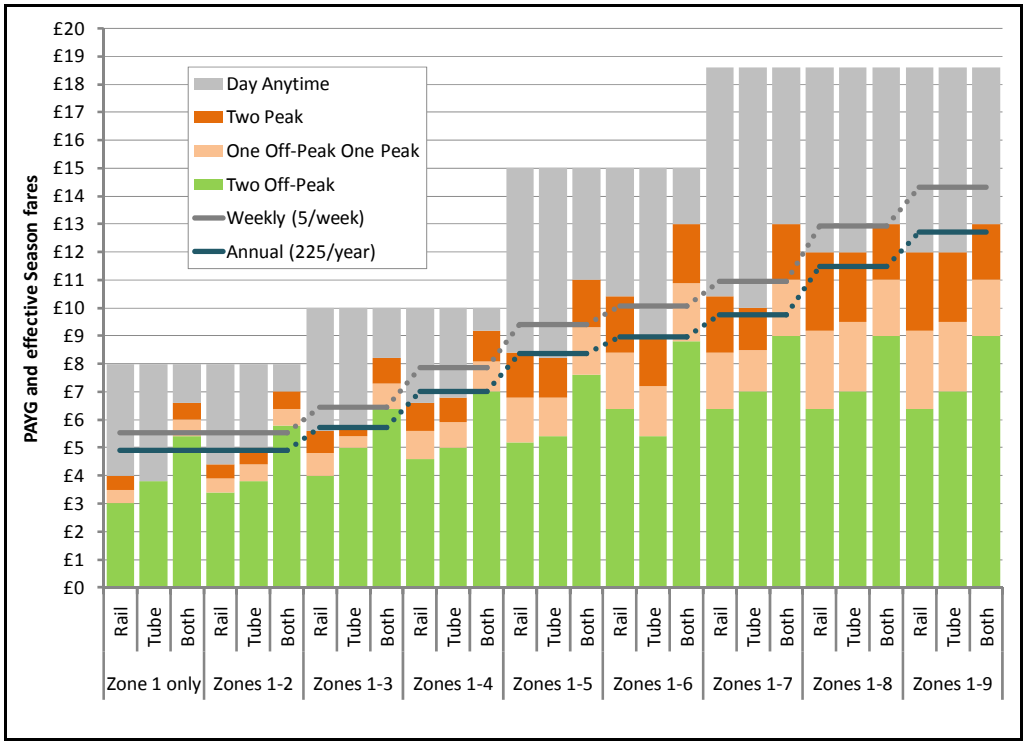
- Pay in advance, through Travelcard seasons valid for periods from a week to a year, or one of two Day Travelcards:
  - Day Off-Peak during the week if travel begins after 09:30, or at weekends
  - Day Anytime during the week if travel begins before 09:30
- Pay as you go (PAYG) with:
  - Off-Peak singles for journeys beginning at weekends or during the week between 09:30 and 16:00 or after 19:00
  - Peak singles at all other times

6.29 In any one day, total PAYG payments are capped at the relevant Day Off-Peak or Day Anytime Travelcard fare.

6.30 Some cheaper fares remain for point-to-point travel between national rail stations within the Travelcard area, but these fares are quasi-regulated by the TfL fares and could not be increased above them without introduce opportunities to undercut them, either by paying TfL fares or by "split-ticketing" between national rail and TfL fares.

6.31 Figure 6.3 below compares fares for travel to and from Zone 1.

FIGURE 6.3 PEAK, DAY AND SEASON FARES IN THE LONDON AREA, 2011



Source: TfL fares, 2011, reanalysed by Steer Davies Gleave

6.32 The Figure shows the relative costs of:

- Two Off-Peak single PAYG fares (green)
- One Off-Peak and one Peak single PAYG fare (salmon)
- Two Peak single PAYG fares (orange)
- A Day Anytime Travelcard (grey), which can still be purchased as a paper ticket
- A 7 Day Travelcard, assuming 5 round trips a week (light dotted line)
- An Annual Travelcard, assuming 225 round trips a year (dark dotted line)

6.33 Three PAYG fares currently apply between each pair of Zones, for journeys on:

- National rail only
- Underground/Overground/Docklands Light Rail (DLR) only
- Using a combination of these services

6.34 Over time it may be possible or desirable to harmonise these fares, reducing the number of PAYG fares for travel to Zone 1 from the 27 shown to 9.

6.35 The chart also shows the average daily cost of a weekly or annual ticket. This is comparable with two peak PAYG fares, and considerably less than a Day Anytime Travelcard. This suggests that, with the Travelcard area, the average fares paid by peak commuters using PAYG, weekly and annual Travelcards are broadly aligned.

6.36 We discuss below a number of the features of the TfL system.

A single step from peak to off-peak

6.37 At present TfL has only two fare levels, Peak and Off-Peak.

6.38 If the primary aim of a system with two fares levels was to move passengers from the high peak to the shoulder peak, it would be necessary to charge Peak fares in the high peak and Off-Peak fares at all other times. Not only would this attract off-peak passengers into the shoulder peak, potentially introducing artificial peaks analogous to those on long-distance services, it would also result in a major loss of revenue. We conclude that any effective peak spreading system would need to have at least three fares levels:

- A high peak fare higher than the present Peak fare
- An off-peak fare probably similar to the current Off-Peak fare
- A shoulder peak fare intermediate between Peak and Off-Peak fares

Little variation of short-distance fares

6.39 TfL fares vary relatively little between peak and off-peak, either in absolute or relative terms. The PAYG discount from travel off-peak varies from nothing for Underground travel wholly within Zone 1 to £2.80 for rail travel from Zones 7-9. The maximum PAYG premium for peak travel in Zones 1-6 is 67%, but the typical premium is around 30%, much smaller in either percentage or absolute terms than at longer distances. For example, at all stations more than 40 miles from Waterloo on the route to Exeter, an Anytime Day Single costs more than a Super Off-Peak Day Return, implying a peak premium consistently over 100%.

No distinction between peak and counter-peak directions

6.40 TfL peak fares generally apply irrespective of the direction of travel although, as discussed in Chapter 4, economically efficient fares for counter-peak travel would be low. In practice, if desired, the direction of travel within the zonal system could normally be identified, provided the passenger has touched in and touched out to mark the ends of the journey.

Lack of marginal signals with fare capping or season tickets

6.41 Holders of Travelcard seasons pay no marginal fare for additional journeys and the daily capping of PAYG fares means that PAYG passengers also pay no marginal fare once a certain threshold has been reached. Not only pay in advance fixed price Travelcards, but also PAYG capping, would need to be changed to ensure that every passenger faced a marginal price for, as a minimum, each peak or shoulder-peak journey.

A regulated off-peak fare

6.42 TfL fixes the level of both peak and off-peak fares and hence the difference between them. National rail Off-Peak Day Return fares from points just outside the Travelcard area are generally unregulated, with the expectation that operators will adopt profit-maximising strategies. If peak-spreading requires not only higher peak fares but also a large differential between them and off-peak fares, it might be necessary to bring some off-peak, and potentially shoulder peak, fares into regulation to ensure that sufficient differential is maintained to provide the intended peak-spreading effect. Without such regulation, profit-maximising operators might raise off-peak and shoulder peak fares, eroding the differentials needed to provide the required peak-spreading effect.

Pricing based on when the journey begins

6.43 On the national rail network, peak restrictions are currently normally based on timetabled time of arrival at, or departure from, London terminals. Restrictions have to date been enforced by a mixture of on-board checks and, more recently, ticket gates at the London terminals.

6.44 There would, however, be a number of practical problems in applying any system in which the fare payable was determined by the times at which the passenger passed through a gate in central London. Open interchanges between national rail, Underground and Overground systems at stations such as Farringdon and Stratford mean that, even within the Travelcard area, many passengers touch in at a national rail barrier line and touch out at a TfL barrier line. Even if the gates share information, there is no reliable means of inferring from touch in and touch out the time at which the train or trains the passenger used were timetabled to arrive at a London terminal. This difficulty will be exacerbated by Thameslink and particularly Crossrail, with open interchange between rail and Underground services in central London.

6.45 On possible remedy would be to make the national rail peak-spreading network a "closed" system, with barrier lines at all interchanges with the TfL system. This would be a complex and costly exercise and might not be considered either practicable or safe at deep level interchanges such as on Crossrail. However:

- On some corridors the peak load is not on the final leg into the central London terminal. Peak pricing would need to be applied to passengers who did not travel to central London, but ideally not to short-distance passengers who did.
- At the beginning of the peak, it would not be "fair" for passengers arriving on delayed pre-peak trains to be charged a peak fare.
- At the end of the peak, there would be an incentive to passengers to delay touching out until the peak had ended (as occurs immediately before falls in the variable road prices in Singapore). This could lead to terminal platforms being "blocked back" with passengers deliberately delaying leaving the gated area.

6.46 TfL's system avoids these problems by basing the fare on when passengers chose to touch in to start their journey, rather than when they touch out on arrival, which could be delayed either by service disruption or deliberately by the passenger.

6.47 For the PM peak this means touching in between 16:00 and 19:00, typically at an Underground station in central London, but for the AM peak it means touching in before 09:30 irrespective of location.

Inconsistent pricing of peak trains

6.48 TfL does not attempt to identify which train passengers board and instead bases pricing on the time at which they touch in.

6.49 This has the effect that an individual train may change from "peak" to "off-peak" or vice versa during its journey, which means that no consistent signal is sent as to whether passengers are to be encouraged to, or discouraged from, boarding the train.

6.50 For peak-spreading to be effective on the national rail network, ideally each train would need to be consistently priced as high peak, shoulder peak or off-peak throughout its journey, which could last an hour or more and span three "half-hour" time bands.

6.51 This would mean that the distinct timings of AM high peak, shoulder peak and off-peak periods might need to be defined as progressively later at each station on the approach to the Travelcard boundary. We have carried out initial analysis which suggests that this could probably be done, but the resulting system would be complex and mean that the definitions of peak, shoulder peak and off-peak would change from station to station.

Changes over time

6.52 Commuters using season tickets are currently entitled to board any train and see no price differential between peak and off-peak. Other passengers may naturally gain or lose, particularly where services are infrequent, according to whether a particular train is just inside the off-peak or just inside the peak.

6.53 If all commuters were subject to differential high peak, shoulder peak and off-peak fares, there could be practical issue if minor retiming moved individual trains from "just off-peak" to "just shoulder peak" or "just shoulder peak" to "just high peak". At stations where services are only half-hourly, a minor timetable change could result in every single train being redefined in this way.

6.54 This could have two undesirable effects:

- The designation of trains as "high peak", "shoulder peak" and "off-peak" would no longer match the actual loadings on them, potentially leading to perverse pricing signals.
- Individual passengers who believed themselves to be "captive" to a particular train, or at least unwilling to travel either 30 minutes earlier or 30 minutes later, could face a change in their annual cost of commuting of several hundred pounds with each timetable change.

6.55 If only for the first reason, it might therefore also be necessary to adjust the definitions of "high peak", "shoulder peak" and "off-peak" with each timetable change to take into account not only the expected loadings on each train but also changes in the underlying patterns of the timing of demand.

Summary

6.56 Within the Travelcard area, the TfL fares structure does not act as an effective peak-spreading system, and for it to do so it might be necessary to:

- Increase peak fares and potentially reduce off-peak and counter-peak fares
- Introduce one or more shoulder peak levels
- End PAYG daily capping so that each additional journey has a price
- Either withdraw or increasingly price up all-inclusive season tickets, until all passengers chose to switch to PAYG and they could be withdrawn

6.57 We now consider two possible scenarios for the introduction of a peak-spreading system on the national rail network:

- In parallel with the existing TfL fares structure
- Applied to both national rail and TfL systems

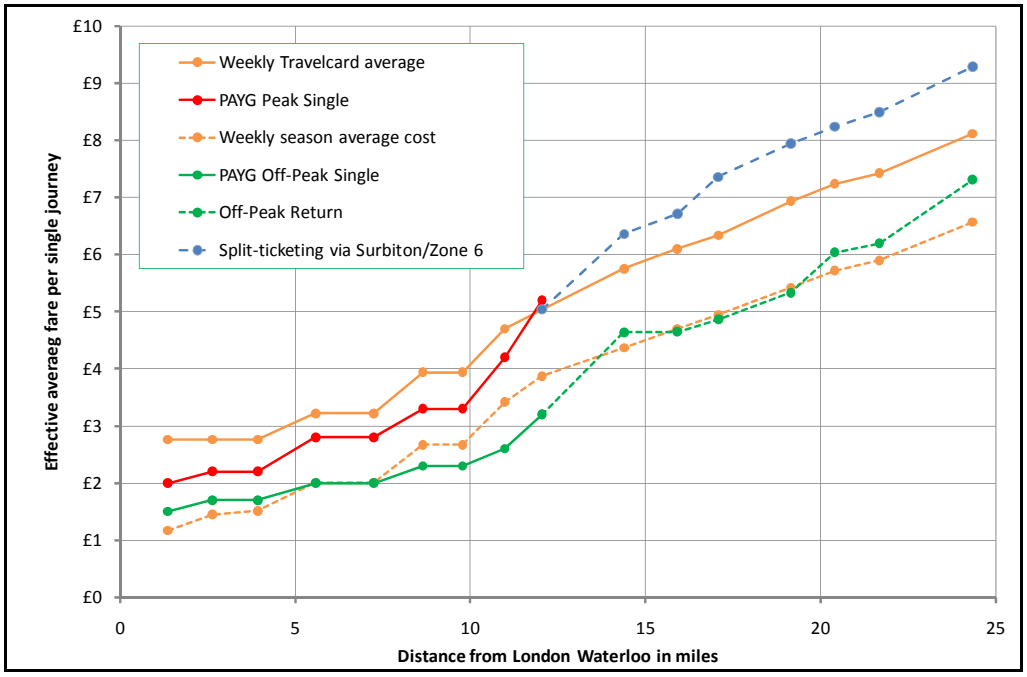
Peak-spreading in parallel with existing TfL fares

6.58 There appears to be at least some scope to leave the TfL fares structure unchanged and to introduce peak-spreading fares for national rail passengers. However, major potential constraints would be the extent to which, on national rail:

- High peak commuter fares could be increased, before it became cheaper for passengers to switch to a TfL Travelcard
- Off-peak commuter fares could be reduced, before either:
  - Creating an anomaly in which travel from beyond London became cheaper than travel within London
  - Abstracting revenue from existing off-peak fares

6.59 Figure 6.4 below shows fares relevant to commuting at various distances on the rail corridor from London Waterloo to Woking, expressed as an average fare per single journey assuming ten single journeys per week on a weekly Travelcard or national rail season ticket.

FIGURE 6.4 FARES IN THE LONDON WATERLOO TO WOKING CORRIDOR, 2011



Source: TfL and South West Trains fares, 2011, reanalysed by Steer Davies Gleave

6.60 The most expensive commuting product is generally the Travelcard, allowing unlimited travel on all modes within the zones covered, and available as an "out-boundary" Travelcard for passengers travelling from beyond London.

6.61 The next most expensive product for single journeys is TfL's PAYG Peak Single, available only for journeys wholly within the Travelcard area.

6.62 The two other main products are broadly similar in average price:

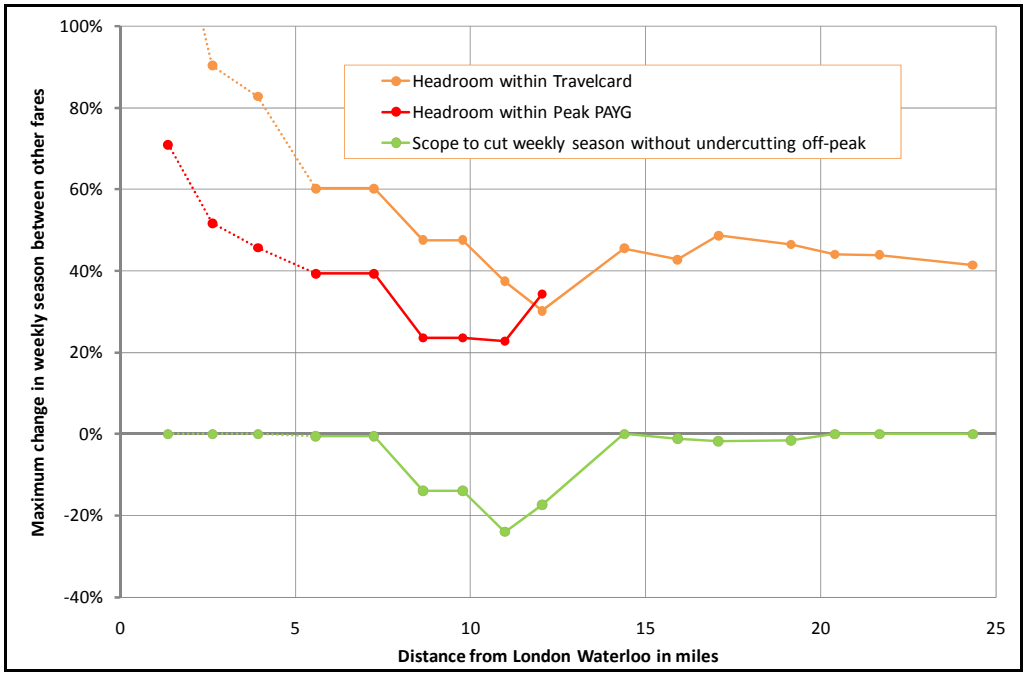
- A weekly rail-only season ticket, valid on rail services only
- Off-peak tickets, represented by TfL's PAYG Off-Peak Single inside the Travelcard area and half the Off-Peak Return outside the Travelcard area

6.63 For stations outside the Travelcard area, we also show the combined cost of buying a point-to-point rail season ticket to Surbiton, the outermost station in the Travelcard area, and an all-Zones Travelcard. This implicitly forms a ceiling for national rail high peak fares, at which it would be cheaper for passengers to "split-ticket" at Surbiton.

6.64 Figure 6.5 below restates the data in Figure 6.4 in the form of the scope to vary the existing rail point-to-point season ticket:

- The lower line shows the amount by which the point-to-point season ticket fare could be reduced, if at all, before it became cheaper than the PAYG Off-Peak Single within the Travelcard area or the Off-Peak Return beyond it
- The upper lines show the amount by which the point-to-point season ticket fare could be increased before it became more expensive:
  - within the Travelcard area, than either a Travelcard or a PAYG Peak Single
  - beyond the Travelcard area, than a Travelcard and a point-to-point season

FIGURE 6.5 VARYING COMMUTER FARES TO SPREAD PEAKS



Source: TfL and South West Trains fares, 2011, reanalysed by Steer Davies Gleave

6.65 Figure 6.5 suggests that the weekly season is already the cheapest fare available except for travel from Zones 4-6, where there is scope to reduce the average fare to the level of the PAYG Off-Peak Single. This means that there is little scope to cut fares for off-peak commuters within a PAYG system without abstraction from other fares.

6.66 Figure 6.5 also suggests that it would be possible to raise the weekly season fare by around 40% before it became cheaper for passengers to switch to a Travelcard, if necessary "split-ticketing" with a point-to-point season ticket for travel outside the Travelcard area.

6.67 In summary, relative to current rail only point-to-point seasons:

- Scope to have lower pay as you go fares in the off-peak is negligible except in Travelcard Zones 4-6, where it may be around 20%
- Scope to have higher pay as you go fares in the high peak is potentially up to around 40%, except in Travelcard Zones 4-6 where it is around 20%

6.68 In practice, the practical scope to vary fares will be limited by the rate at which high peak rail-only commuters trade up to Travelcard, allowing travel on all other modes in London, if necessary augmented by an point-to-point season for the out-boundary element of the journey.

Characteristics of peak-spreading in parallel with existing TfL fares

6.69 Assuming that the above analysis of the London Waterloo to Woking corridor is broadly representative of other commuter corridors from London, it is possible to estimate the potential impacts of introducing peak-spreading in parallel with existing TfL fares.

6.70 We assume that this would take the form of a system combining smartcards and pay as you go single fares in which:

- Point-to-point rail season tickets would no longer be offered for travel in the area over which peak-spreading is applied
- To create headroom to raise rail-only fares, out-boundary Travelcards would be priced up to the sum of a point-to-point season to the outermost station in the Travelcard areas and an all-Zones Travelcard
- A pay as you go Peak fare of nearly 10% of the weekly Travelcard fare would replace Anytime Single and Return fares
- A pay as you go Off-Peak fare of around 10% of the weekly season fare or 50% of the Off-Peak Return fare would replace Off-Peak Single and Return fares
- A pay as you go Shoulder Peak fare would be introduced at an intermediate level

6.71 We assume that, as a minimum, TfL would cooperate to the extent necessary either to provide touch-in/touch-out facilities at all interchanges between national rail and TfL services or to enable its own ticket gates to share data with the national rail system on the time and location of each touch in and touch out.

6.72 In practice, we have identified a number of practical constraints to introducing such a system in parallel with existing TfL fares.

6.73 First, it might be necessary to charge peak fares even for counter-peak travel, at least within the Travelcard area, if it were unacceptable to TfL for its existing PAYG Peak Singles to be undercut by national rail off-peak singles.

6.74 Second, the peak spreading system would have no effect on passengers who use modes other than rail and already use TfL's Travelcard or multimodal PAYG fares.

6.75 Third, it might not be possible to raise high peak fares significantly without extensive transfer of passengers to TfL fares. This would limit the scope either to vary fares or to influence the behaviour of rail-only travellers.

6.76 Fourth, we understand that the timing of the high peak varies between London terminals, although we are still awaiting the data required to confirm this. This means that the timing of high peak, shoulder peak and off-peak periods might need to be specific to each London terminal, and could not readily be standardised through London.

6.77 Fifth, for peak-spreading to be effective, each AM peak train would need to be consistently priced as high peak, shoulder peak or off-peak throughout its journey, which could last an hour or more. This would mean that the distinct timings of AM high peak, shoulder peak and off-peak periods might need to be defined as progressively later at each station on the approach to the Travelcard boundary.

6.78 Sixth, consideration would need to be given to changes over time as either rail timetables or underlying patterns of demand changed. Particularly where services were only half-hourly, it would be undesirable for a minor timetable change to result in most or all trains being allocated to a different peak level if the underlying demand for them was unchanged. More widely, it might be necessary to review the timings of the high peak, shoulder peak and off-peak at each station

with each timetable revision, to make sure that the fares differentials continued to support the peak-spreading objective.

6.79 Seventh, peak-spreading might result in bunching of passengers just before fares rose or just after they fell. As noted above, an analogous effect has already been detected among motorists waiting for Singapore's variable road tolls to fall. This might be manageable in the AM peak, with touch-in dispersed over hundreds of stations, but could result in congestion at PM peak touch in, primarily at London terminals. At London Bridge, for example, large numbers of commuters arriving on foot might defer touch in until prices fell and then dash en masse for the next available train.

6.80 Eighth, any high peak capacity vacated by rail-only passengers might merely be refilled by Travelcard holders. On the corridor to Waterloo, for example, any spreading of the peak outside the Travelcard area might disappear at Surbiton, where Travelcard users might move from the shoulder or off-peak into any high peak capacity vacated by rail-only ticket holders. We would expect this effect to occur everywhere that long-distance trains stop at stations in outer Zones, most obviously at East Croydon but also at stations such as Orpington, Harrow and Wealdstone, Romford and Upminster. In practice, effective peak-spreading on the most heavily loaded leg of the journey might be limited to trains which run non-stop from beyond the Travelcard boundary to a central London terminal.

6.81 Ninth, and as a consequence, the principal redistributive effect of the peak-spreading measures would be not between peak and shoulder peak travellers but between Londoners and non-Londoners. A scheme implemented in parallel with TfL's existing fares might be seen as "replacing non-Londoners occupying peak trains over a long distance with Londoners occupying them over a short distance".

6.82 Tenth, and as a further consequence, the overall effect of peak-spreading measures might be that peak trains carried the same number of passengers but on average over shorter distances. This would be in the opposite direction to the original Objective 3 set out in paragraph 6.5, that "The structure of fares should encourage efficient use of available capacity".

6.83 In summary, if peak-spreading were to be implemented in parallel with existing TfL fares:

- Within the Travelcard area, it would probably have to apply to both peak and counter-peak journeys
- Its effects would be limited to passengers using only national rail services
- There would be limited scope to vary fares for these passengers before they upgraded to Travelcard
- The timings of the peak might need to be fine-tuned to each corridor and station and reviewed with each timetable change
- The travel times of rail-only passengers might bunch around the times at which fares changed, particularly in the PM peak at central London terminals immediately after the prices had fallen
- Any peak-spreading by rail-only passengers would probably be largely negated by holders of TfL tickets moving back into the high peak space they vacated,

limiting the effects to trains running non-stop from the Travelcard boundary to a central London terminal

- The net effect would be that peak trains would be occupied by more Londoners and fewer non-Londoners, and the overall use of the available capacity might be worsened

Peak-spreading applied to both national rail and TfL fares

6.84 If peak-spreading measures were applied on a consistent basis on both national rail and TfL services, it would be possible to address or mitigate some of the difficulties identified above. In particular:

- It would be possible to charge different fares in peak and counter-peak directions on a consistent basis
- Peak-spreading could be applied consistently to all users of rail services
- Peak-spreading fares differentials would not be constrained, or quasi-regulated, by other fares
- Peak-spreading fares differentials at different distances could be tuned, if desired, to ensure that capacity on long-distance trains was allocated as far as possible to long-distance passengers, improving the overall use of their capacity (although short distance travel on long distance services could probably more effectively be addressed by a combination of removing stops, pick-up/set-down restrictions and, if needed, differential fares between service groups)

6.85 However, a number of practical issues would remain, in particular:

- The need either to operate separate TfL and national rail smartcard schemes in parallel through the same station gates or to combine the schemes into a common smartcard standard such as ITSO
- The potential need not only to define the peak at each station but to review the definition with each timetable change, and the consequent complexities of explaining both the system and the changes
- The risk of bunching of passengers around the edges of the peaks, particularly in the PM peak at central London stations

6.86 Inclusion of TfL services in the peak-spreading system could, at its worst, mean that crowds gathered outside central London rail and Underground stations in the PM peak immediately before each fares reduction, temporarily blocking the entrances and creating artificial demand peaks exactly analogous to those seen on the long distance network and examined as Option 3.

6.87 One means of mitigating both effects would be for there to be a finer graduation of fares between high peak and off-peak. It would, in principle, be possible for fares to increase and decrease minute by minute in steps as small as one penny. Where service frequencies were low, however, the effective price step between consecutive trains would still be large. A step of £1 between successive trains in each direction equates to a difference of around £450 in the price of annual travel.

Modelling

6.88 We developed the Faber Maunsell peak-spreading model described in Appendix A to improve its functionality in three ways:

- To deal separately with commuting from within the Travelcard area, from between the Travelcard area and 60 miles from London, and from more than 60 miles from London.
- To model the period 0700-1100 to take into account interactions with off-peak demand, where data on it are available.
- To improve modelling of the combined effect of fares and crowding on passengers' decisions whether or not to commute by rail.

6.89 We based many modelling parameters on the recommendations in the Passenger Demand Forecasting Handbook (PDFH), with the most critical parameters, fares elasticities, taken from version 5.0. However, some of the key model parameters are necessarily dependent on Faber Maunsell's own research, based on relatively small samples, and not yet corroborated by other studies.

6.90 We applied the model to:

- The South West Main Line corridor to London Waterloo
- The Great Western Main Line corridor to London Paddington
- All London Midland services to stations in central Birmingham

6.91 In each case we assumed that peak-spreading fares would be applied on a consistent basis on national rail and TfL services, replacing both season tickets and Travelcards.

6.92 The principal findings of our modelling, given current assumptions, were as follows:

- Aggregate high peak half hour demand could be reduced to the level of the adjacent shoulder peak half hours with increases of no more than 40% in the high peak fare and 20% in the shoulder peak fare.
- With these increases, a reduction in off-peak fare does not appear to be needed, although we have only modelled the 3-4 hour peak period and not the whole off-peak. This suggests that it might be feasible, as discussed above, to move to a wholly pay as you go system, rather than one with an "off-peak season ticket" with supplements for shoulder peak or high peak travel.
- In the London Waterloo corridor, assuming that peak-spreading is applied at distances of up to 60 miles, over half of the peak-spreading effect would be from changes in the Travelcard area. This confirms that this would dominate the overall effect, and that cooperation with TfL would probably be essential.
- In the London Paddington corridor, only around one quarter of the peak-spreading effect would be from changes in the Travelcard area, suggesting that there might be more scope to introduce a peak-spreading scheme independent of TfL. However, the absolute volume of commuting on this corridor is relatively small.

- In Birmingham, the absolute volume of commuting is smaller still, and high peak load factors are considerably lower than in London, so the need for peak-spreading is currently low.
- The modelled effects are a mix of peak-spreading, change of mode and decision not to travel. The relative importance of the latter effects depends on average elasticities, rather than detailed modelling of competitive options for each flow, and must be considered subject to a considerable range of uncertainty. One implication is that there might be a material shift to competing modes, in particular to bus services within inner London and other cities.

6.93 However, the timing of the high peak, and the level of price differential required to achieve the desired peak-spreading effect, differ not only between the corridors examined but also between service groups within each corridor. This suggests that both the level and timing of peak-spreading fares might need to be fine-tuned for each corridor, service group and, potentially, each station.

6.94 We modelled a scenario with the following changes in fares relative to the levels at which season tickets would otherwise have been regulated:

- An increase of 40% in the high peak fare
- An increase of 20% in the shoulder peak fare
- No decrease in off-peak commuter fares

6.95 The modelling suggested that application of peak-spreading on this basis would raise around £140 million per annum nationally at current revenue levels. Assuming implementation could begin with the January 2014 fares rise, and be completed over a period of five years with the January 2018 fares rise, the additional revenue in the final year of CP5 would be around £200 million and the cumulative revenue gain by then would be around £500 million.

Issues and implementation

6.96 Our analysis, based on partial data, suggests that peak-spreading might allow:

- An additional 5% or more passengers within existing shoulder peak train capacity, as estimated from Network Rail's data shown in Figure 6.2
- An additional 10% or more passengers if shoulder peak train capacity could be increased to high peak levels within existing infrastructure capacity
- Over the longer term, potential further gains if working patterns adapted to take account of the pricing signals

6.97 However, the theoretical initial gain within existing peak capacity may be difficult to achieve in practice, as it might require continued precise, route-by-route and station-by-station adjustment of prices in specific time bands, and could not eliminate the inevitable daily fluctuations in demand. Given our conclusion that peak-spreading would need to be coordinated between TfL and national rail services, TfL would also need to deal with these issues on each corridor of its Underground, Overground and DLR services.

6.98 We therefore conclude that the potential gains from peak-spreading might be greater if investment were made to expand shoulder peak capacity to high peak levels, and peak-spreading were then applied within the greater overall capacity

headroom this would produce, deferring the need for investment in infrastructure capacity. While capacity expansion programmed within CP4 has not generally been directed to broadening the supply peak, this could in principle be pursued in CP5 and subsequent control periods. The principal investment, in additional rolling stock and the associated depot and stabling facilities, and additional operating costs including train crew, cleaning and maintenance staff, would be led by the operators, rather than Network Rail, and could be specified in revised or new franchise agreements.

6.99 As set out above in paragraph 6.56, implementation of peak-spreading measures might require the following actions:

- Increase peak fares and potentially reduce off-peak and counter-peak fares
- Introduce one or more shoulder peak levels
- End PAYG daily capping so that each additional journey has a price
- Either withdraw or increasingly price up all-inclusive season tickets, until all passengers chose to switch to PAYG and they could be withdrawn

6.100 Note that there is no obvious reason not to make fares more variable if this better reflects costs. That it might have only limited impact on behaviour would not, in itself, be a reason for not doing so, especially if all that were required were to change, over time, the small number of zonal fares in the Travelcard area.

6.101 If TfL were able and willing to begin implementation, which could not be before January 2012, we assume that it would be able to impose increases in individual fares faster than the national rail industry's RPI+3%. This is because all fares in the Travelcard area are regulated, and TfL would, if it wished, be able to demonstrate to passengers that rapid rises in high peak rail fares were offset by reductions elsewhere.

6.102 A key factor in the extent to which high peak fares create peak spreading will be the extent to which rail passengers transfer to other modes, particularly in inner London where bus, Underground and car may be practical alternatives. Peak-spreading measures might need to be supported by measures to improve high peak bus services, such as priority measures and additional capacity, at least in inner London.

6.103 While our analysis focuses on London, in other cities bus services are deregulated and there would be limited scope to coordinate bus services and fares to support rail peak-spreading. One possible effect would be that commercial operators would increase peak bus fares without providing any additional capacity.

6.104 The actual fares differentiation required to achieve any degree of peak-spreading is therefore uncertain for reasons including:

- The limited research to date into the many variables involved
- The dependence on the quality and capacity of alternatives in the high peak
- The potential longer term effects of adaptation of working patterns

6.105 For this reason we would recommend an incremental approach, with a stated aim of increasing fares differentials until a defined, and quantified, effect was

achieved, rather than a statement that a particular differential was to be imposed.

6.106 Nonetheless, even if it were necessary for real high peak fares to increase by as much as 40%, we assume for indicative purposes that it might be possible to achieve this over five years, requiring an average increase of RPI+7% in high peak fares. This suggests that implementation could be broadly achieved by the end of CP5.

6.107 A potential initial constraint is the ability of TfL's existing systems to move from a 2-tier to a 3-tier pricing system, without which it is possible to move demand between peak and off-peak but not to redistribute it within the peak. We have not contacted TfL regarding the current or potential functionality of their existing systems or subsequent replacements.

6.108 We have not examined how the existing franchising arrangements, which incentivise profit maximisation subject to number of obligations and constraints, could be modified to include a requirement to take part in peak-spreading, particularly if each franchisee needed, as a minimum, to coordinate its fares closely with those of TfL.

6.109 Assuming that TfL were able to lead implementation, it would be desirable to carry out a pilot study outside the Travelcard area. An obvious potential example would be the corridor from Fenchurch Street, which is self-contained as a railway but has a number of open interchanges with TfL services. We note again that a precursor to effective peak-spreading might be expansion of shoulder peak capacity, but the potential costs or timescales required to do so are outside the scope of this study.

Conclusions and recommendations

6.110 Provided that it applied to all users of rail services, including holders of TfL Travelcards, peak-spreading could help address Objective 3, encouraging efficient use of available capacity. A reduction in peak demand of only a few percent might seem small, but the costs of schemes such as Thameslink and Crossrail suggest that each incremental expansion of rail capacity around London by 10% could cost of the order of £10 billion.

6.111 It would address Objective 2, ensuring that passengers using peak services pay fares that reflect the costs of providing peak capacity, and Objective 6, fairness between commuters and other passengers.

6.112 Our initial analysis suggests that peak spreading, while potentially valuable, would also be potentially complex. We are not aware of any attempts to design and implement such a system elsewhere and London, with by far the most extensive rail commuting in Europe, presents a particular challenge. Extensive further analysis would be required to validate a model capable of addressing all the relevant issues.

6.113 If the fares differentials required to spread the peak were as high as current modelling suggests, the first decision for Government and TfL might be how far they were willing to allow the headline high peak fare to rise. We have assumed that the rise might need to be as much as 40% for some passengers, some of whom

may be relatively low-income inner London commuters. The second decision would be whether to regulate off-peak national rail fares to underpin peak-spreading, or to leave them unregulated, potentially allowing them to rise and generate additional revenue.

6.114 Taken with the uncertainty due to the factors listed in paragraph 6.104, this means that the net revenue impacts of peak-spreading are particularly uncertain. More importantly, peak-spreading would require more extensive regulation of fares within the peak-spreading area including, potentially, the re-regulation of off-peak fares. If this were necessary, then average fares, and hence any net revenue gain, would be an explicit input to the process, rather than an outcome.

6.115 If it is decided that peak-spreading should be pursued further, we recommend that:

- Exploratory discussions be held with TfL to share thinking and to discuss the likely scope for agreement on movement to a common peak-spreading fares structure, and in particular any critical technological issues.
- Additional work be carried out by Network Rail to identify if and where peak-spreading could allow capacity expansion schemes to be deferred or avoided.
- Additional research be carried out to improve modelling of passenger reaction to changes in crowding levels and fare, particularly over the longer term. One area which could be examined is whether and by how much demand peaks narrow after capacity expansion, either on national rail or on TfL services.
- Additional analysis be carried out to validate our initial thinking, to identify the practical issues in more detail, and to develop a more detailed working proposal on how, when and where peak-spreading could be implemented and incorporated into the franchise model.
- The effect of the implied move to “pay as you go” and hence single leg pricing throughout the peak-spreading area be investigated.

7 Option 2, the Price Taper on Season Tickets

Introduction

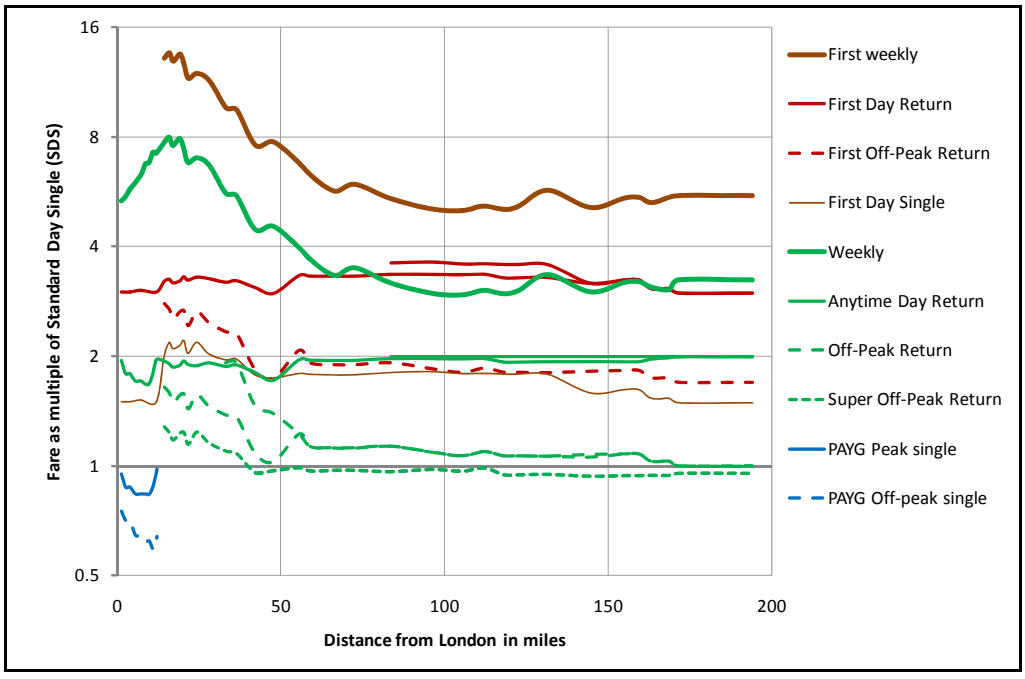
7.1 High discounts for long distance season tickets originate from BR's fare setting, when there was little long distance commuting but a need to set a notional fare. In practice, passengers buying weekly seasons may have originally been those needing to make two trips per week, rather than daily commuters.

7.2 Since privatisation, explicit regulation of season tickets, at all distances, has encouraged commuters deciding where to live and work to expect that future fares will be at close to current levels. In this sense the current fares are a "ticking time bomb", encouraging commuters to take advantage of lower house prices outside the cities in the expectation that the real price of commuting will not change materially. Our analysis shows that these commuters may be travelling in the high peak at fares not only below Anytime fares for peak travel but also below unregulated fares, set in the market, for off-peak travel.

Literature review

7.3 As part of our literature review we examined the current fares structure for South West Trains. Figure 7.1 summarises the current structure of fares for travel to London, with each fare expressed as a multiple of the Anytime Day Single fare. The Standard weekly season fare is shown by the broad solid green line.

FIGURE 7.1 RELATIVITIES BETWEEN SOUTH WEST TRAINS FARES, 2010



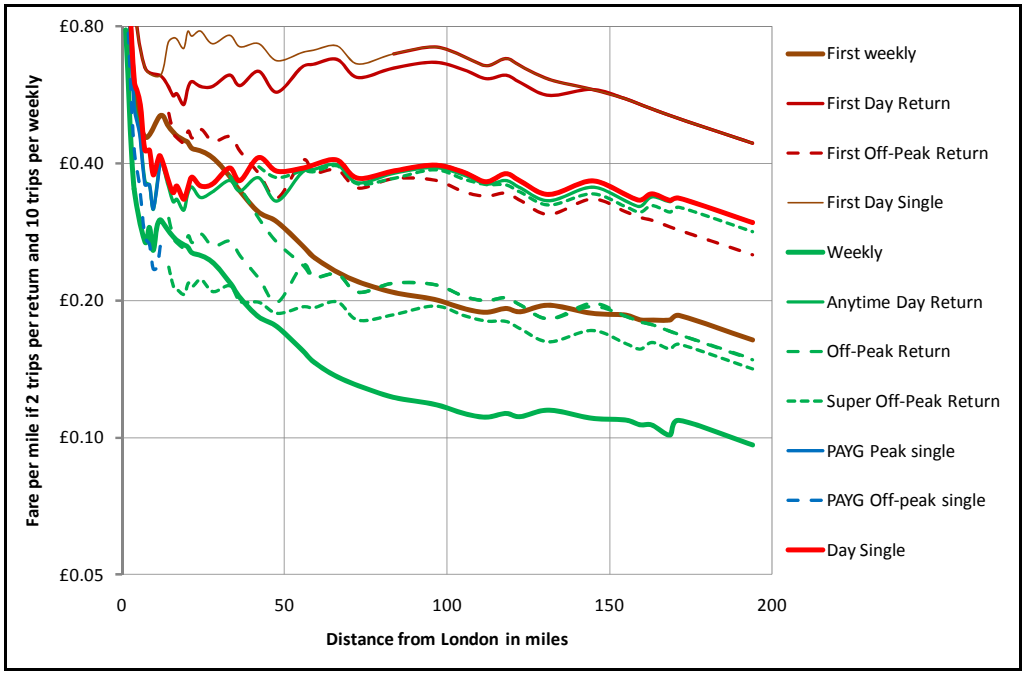
Source: South West Trains fares, 2010, reanalysed by Steer Davies Gleave

7.4 At distances of around 20 miles from London, just outside the Travelcard area, the price of a weekly season peaks at around eight times that of an Anytime Day Single

or four times that of an Anytime Day Return. By 50 miles from London this multiple halves to around twice the Anytime Day Return. At over 60 miles it is never more than 1.75 times, and sometimes less than 1.5 times, the Anytime Day Return. This means that at long distances passengers need only make, or have a reasonable expectation that they may need to make, a second peak trip to London before it becomes better value to buy a weekly season.

7.5 In addition, the effective price per mile of seasons is low. Figure 7.2 restates the fares data in Figure 7.1 on a pence per mile basis, assuming each return ticket is used for two single trips and each weekly season is used for ten single trips. The Standard Day Single fare, not shown in Figure 7.1, appears as a thick red line.

FIGURE 7.2 SOUTH WEST TRAINS FARES IN PENCE PER MILE, 2010



Source: South West Trains fares, 2010, reanalysed by Steer Davies Gleave

7.6 The Standard Day Single fare never falls below £0.30 per mile and remains below £0.40 per mile even at Wimbledon, only 7 miles from London. At most distances, the only more expensive fares are for First Class travel.

7.7 The cheapest return fares are the Off-Peak Return and Super Off-Peak Return which fall gradually to around £0.20 per mile and ultimately to £0.15 per mile from Exeter.

7.8 The cheapest fare by far is the weekly season ticket, which if used daily costs less than £0.20 per mile by Fleet, only 36 miles from London, £0.12 per mile by Salisbury, 83 miles from London and ultimately less than £0.10 per mile at Pinhoe and Exeter St David's. While use of these fares for daily commuting is probably small, this is not only a discount of around 70% on the Standard Day Single but also probably less than the fuel cost of even a small car.

Our analysis

7.9 This large discount on season tickets at longer distances raises issues of consistency and fairness relative to:

- Anytime Day Single and Return fares
- Season ticket fares at shorter distances
- Off-Peak Returns

7.10 The Off-Peak Day Return fare is unregulated and hence determined in the market. At present the weekly season ticket not only gives a discount on the cost of five Off-Peak Day Returns but also allows peak travel. Within the Travelcard area, in contrast, the average cost of a weekly Travelcard is always higher than that of ten PAYG Off-Peak Singles.

7.11 For illustrative purposes, one approach would be to ensure that the weekly season ticket fare should be at least five times the current, and market-priced, Off-Peak Day Return fare, at least where it exists. This would help achieve our proposed Objective 2, that "Passengers using peak services should pay fares that reflect the costs of providing peak capacity".

Modelling

7.12 In practice, the unregulated Off-Peak Day Return is replaced at longer distances by the regulated Off-Peak Return or Super Off-Peak Return, the former Saver fares examined in Option 3.

7.13 For modelling purposes, rather than link the season ticket to either of these fares, we assumed that the minimum season ticket fare would be equivalent to £0.25 per mile for a weekly season used for five round trips. Figure 7.2 suggests that this is higher than the cost of five Off-Peak Returns, but is the current average season ticket fare per mile at distances of around 60 miles. Setting a minimum season ticket price at this level would therefore generally result in increases in season ticket prices at distance of over 60 miles. In practice, and to avoid anomalies, we assumed that this floor fare would be applied to season tickets at all distances.

7.14 The modelling suggested that application of a floor season ticket price on the basis of a minimum fare of £0.25 per mile would raise around £15 million per annum nationally at current revenue levels. Assuming implementation could begin with the January 2012 fares rise, and be completed over a period of seven years with the January 2018 fares rise, the additional revenue in the final year of CP5 would be around £20 million and the cumulative revenue gain by then would be around £80 million.

7.15 A floor season price of five times the Off-Peak Return would raise less additional revenue.

Issues and implementation

7.16 We stress that the above analysis is not a recommendation but an estimate of the effect of illustrative assumptions, which could be changed. As with the value of X in RPI-X, the pricing of season tickets is not rooted in any particular calculation, and would be a policy decision for Government.

7.17 Implementation would require a number of steps:

- Identifying revised target price levels for weekly seasons
- Removing the season ticket fares from fares basket regulation
- Increasing the season ticket fares until the new target price level was reached
- Either returning the season ticket fares to fares basket regulation, or subjecting them to individual regulation thereafter

7.18 Analysis of the South West Trains fares summarised in Figure 7.2 suggests that, even to reach five times the unregulated Off-Peak Day Return fare, some weekly season ticket prices in the London Waterloo to Exeter corridor would need to rise by up to 80%. It seems unrealistic to assume that such a rise could be implemented in a single step. If it were spread over seven fares rises, for January 2013 to January 2019 inclusive, at least some fares would need to rise by RPI+9% for seven successive years. Alternatively, application of a national season ticket floor fare of £0.25 per mile would require a doubling of the price of some season tickets.

7.19 The key policy issues are:

- The level to which season ticket fares should rise
- The rate at which the rise should take place

7.20 For our assessment we have assumed that the rises to a £0.25 per mile floor would be applied in equal percentage increments over the seven years 2013 to 2019.

Conclusions and recommendations

7.21 Raising long distance season ticket fares would address Objective 2, ensuring that passengers using peak services pay fares that reflect the costs of providing peak capacity, Objective 3, encouraging efficient use of available capacity, and Objective 6, fairness between commuters and other passengers. It would also support sustainability by discouraging long-distance commuting: daily commuters living 60 miles from their work travel over 25,000 miles a year, equivalent to at least one trip round the world.

7.22 The rationale for raising long distance season ticket fares would remain strong, even if it affected few passengers and generated little net revenue, because it would remove the existing distortion, and send more consistent signals about the cost of long-distance commuters consuming peak capacity.

7.23 Nonetheless, our estimates that some season ticket fares might need to rise by up to 80%, even to be consistently as expensive as Standard Off-Peak Returns, suggest that at least some current commuters would be considerably worse off.

7.24 If it is decided that the price taper on season tickets should be reduced, we recommend that:

- Additional analysis be carried out to examine the likely location and number of long distance season ticket holders who would be affected by the proposed increases.
- If necessary, consideration be given to a “hardship” scheme, establishing a register of holders of long period season tickets at a certain date, for whom prices would continue to be regulated at an lower level. As with existing

schemes for discounted travel to current and former rail industry employees, such a scheme would need careful design to avoid fraud and to ensure that the pool of beneficiaries declined over time.

- More detailed modelling be carried out of the additional revenue which could be obtained by each operator, with a view to permitting existing franchisees to raise season ticket fares but to return the additional revenue to DfT on a "No Net Loss/No Net Gain" (NNL/NNG) basis.

8 Option 3, the Standard Off-Peak Return or "Saver"

Introduction

8.1 The continued validity of the former Saver fare into the shoulder peak, particularly for PM peak departures from London, appears to contribute to a "spurious" peak in demand and can result in severe overcrowding. This continues in these markets despite extensive yield management and the use of advance purchase fares which are readily visible on the internet to a large proportion of potential passengers.

8.2 Option 1, peak-spreading, relates to excessive demand in the commuter market high peak, due to under-pricing relative to the shoulder peak. Option 3, in contrast, relates to how regulation of the Standard Off-Peak Return or Super Off-Peak Return in the long distance markets has created excessive demand in the shoulder peak, due to under-pricing relative to peak and/or off-peak.

Literature review

8.3 DfT commissioned Faber Maunsell, in conjunction with NERA Consulting, to undertake a study "Saver Fares: Differentiation and Potential Deregulation" which reported in July 2007.

8.4 Faber Maunsell carried out a literature review, including some of the documents we have also reviewed, surveys of 1,250 passengers, and stated preference work in which passengers were offered a choice of different tickets at different times. They then developed a model of the utility of different ticket types and the option of not travelling:

- Open, comprising fare
- Saver, comprising fare, time displacement and a constant
- Advance, comprising fare, time displacement, a disutility proportional to how far in advance of travel that purchase was required, and a constant
- Not travelling

8.5 The model was tested on two notional corridors, of 190 and 270 miles, to examine changes such as:

- A "shoulder Saver" 40-50% above the Saver fare, not clearly defined but presumably available in the shoulder peak
- Reductions in Saver availability
- Increases in Saver fares
- Reductions in off-peak fares
- Increased availability of Advance tickets

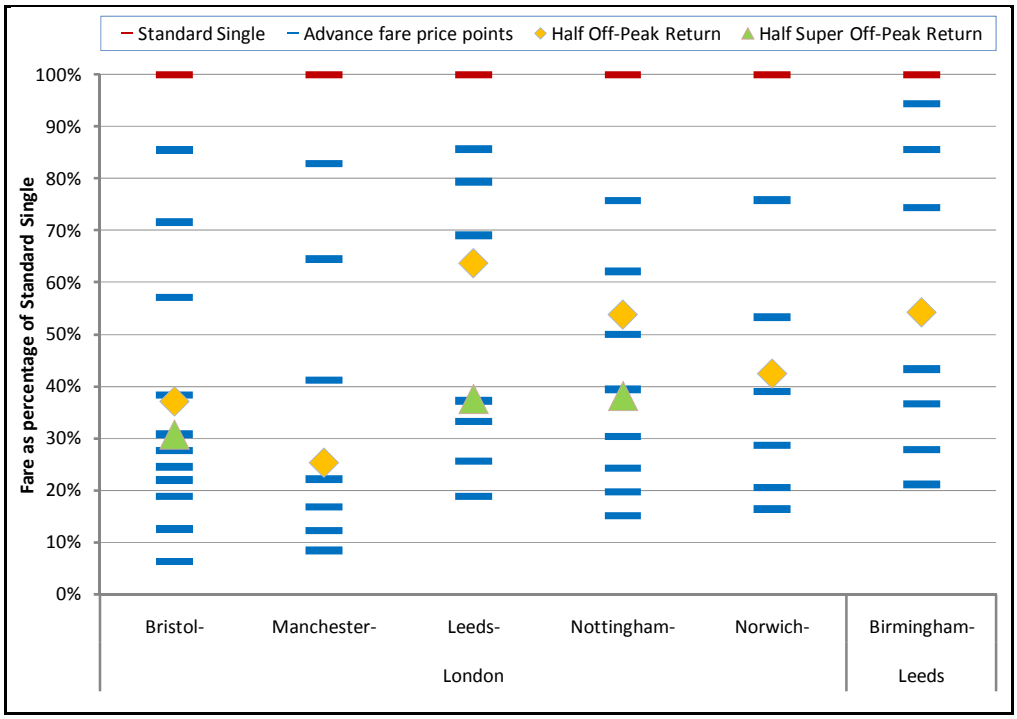
8.6 The general conclusion was that increases in Saver fares would lead to an increase in operator revenue, but that a combination of shoulder peak fares and reduced off-peak Saver fares could help manage demand in a way that would be revenue-neutral.

8.7 We have access to the model parameters and made use of them in our work.

Our analysis

8.8 Each of the long-distance passenger operators has developed a yield management capability. There are typically between 6 and 12 advance purchase "price points" in each class. Figure 8.1 compares the price points for Standard travel on six long-distance flows (blue bars) with the Standard Single fare (red bar), half the Off-Peak Return (yellow diamond) and, where applicable, the Super Off-Peak Return (green triangle).

FIGURE 8.1 RELATIVE SINGLE, RETURN AND ADVANCE FARES, 2010



Source: National Fares Manual

8.9 The advance purchase fare levels range from over 90% to only 10% of the Standard Single, providing a much more granular set of fares for revenue maximisation and demand management than the three-tier Standard, Off-Peak and Super Off-Peak structure. Operators can control not only whether a price level applies to a train but also the number of places available, the "quota", which can be revised at intervals before the departure date if demand appears to be stronger or weaker than expected.

8.10 The continued existence of the regulated off-peak fare limits the fare that can be charged for any train in the period in which it is available and, as discussed above, the large fare differential between the Anytime fare and the cheapest off-peak fare leads to artificial peaks in the shoulder peak period. Economic principles suggest that the response should be to increase price on the overloaded train, but this is prevented by the regulated fare.

8.11 There is, of course, a market for walk-up fares, particularly where services are frequent. However, uncertainty over the actual level of demand for a particular train means that, to minimise the probability of overcrowding, sufficient capacity must be withheld from advance purchase to exceed a realistic volume of walk-up

demand. This implies additional costs and therefore justifies a premium for walk-up availability.

8.12 The existence of this premium suggests that operators would retain some off-peak walk-up fares even if regulation was removed. However, any extension of the peak period, when only Anytime fares are available, would reduce the affordability of walk-up fares to leisure passengers.

8.13 An alternative to complete deregulation would be to allow regulated off-peak fares to rise faster than RPI+3% which, if operators continued to apply the maximum permitted increase, would gradually remove the regulated off-peak return fares. However, Figure 8.1 suggests that this would take considerable time for some flows, such as Manchester-London on the West Coast, where the Off-Peak Return is cheaper than the Off-Peak and Super Off-Peak Returns on other routes.

Modelling

8.14 We have developed the Faber Maunsell "Saver" model described in Appendix A in a number of areas:

- To estimate passengers' choice of departure times and ticket types, based on the "ideal" departure time profile developed for the MOIRA2 model of passenger demand, supplemented by other data and judgement to reflect differences in the profile for Fridays
- To allow for both Off-Peak Returns and Super Off-Peak Returns
- To include elasticities of demand to average price by journey purpose
- To make use of data on the quotas for Advance tickets, and actual passenger loadings, provided by operators

8.15 The resulting model is in principle applicable to any route, but we have addressed the following services, for the first three of which we developed populated versions of the model:

- East Coast Friday northbound services to Leeds, illustrated in Figure 3.1
- East Coast Friday northbound services to Scotland
- Great Western weekday westbound services to the West of England
- Great Western weekday westbound services to Bristol and South Wales

8.16 Both East Coast and Great Western operators offer both Off-Peak Returns and Super Off-Peak Returns.

8.17 However, calibration of the models for this study has proved problematic:

- On East Coast services, we were initially unable to reproduce the passenger loading data provided by the operator. Detailed examination suggested that the sample passenger loads provided, for a single day, had the opposite of the expected effect, with an artificial peak after, rather than before, the beginning of PM peak restrictions. This was largely but not completely resolved by additional data provided by East Coast for June and July 2010. However, further issues, relating to the grouping of intermediate flows with different calling patterns, could not be resolved within the reporting timescales of this study.

- On Great Western West of England services, the extent and timing of the observed artificial peak was also, at first sight, inconsistent with the underlying theory, although this may have reflected patterns of calling points that are not yet fully represented in the model. In addition, data provided by Great Western grouped Friday with other days.

8.18 We have discussed these issues with the operators, and it is likely that additional data and analysis would enable a more consistent and satisfactory calibration of the model, and allow the modelling of different days of the week and of travel towards London. In the absence of such a calibration however, we have carried out some relatively simple analysis using the East Coast models and extrapolating the results to national level.

8.19 Our view is that removal of regulation from the regulated off-peak return fare would not enable operators to price up excessively, and that Advance ticket quotas could be used to ensure that shoulder peak capacity was used efficiently but with lower levels of crowding.

8.20 We estimate that allowing the relevant regulated off-peak return to rise by around 40%, and associated optimisation of Advance ticket quotas, might raise around £20 million per annum at current revenue levels, although this estimate must be subject to a large margin of error. Assuming implementation could begin with the January 2013 fares rise, and be completed over a period of 5 years with the January 2018 fares rise, the additional revenue at the end of CP5 would be around £25 million and the cumulative revenue gain by then would be around £125 million.

Issues and implementation

8.21 The above results are necessarily tentative, given the outstanding difficulties of calibrating the models with the data which could be obtained from the operators within the timescale of this study.

8.22 Nonetheless, there appears to be a good case for pursuing Option 3, which could both raise overall revenue and reduce overcrowding.

8.23 If desired, the risk could be mitigated by allowing the regulated fare to rise faster than other regulated fares, but only in relatively small increments, to allow observation of the effects on both revenue and crowding. Assuming, for indicative purposes, that the regulated off-peak return fare were to rise by 40%, this would require an average increase of RPI+7% over five years.

Conclusions and recommendations

8.24 Raising regulated Off-Peak Return or Super Off-Peak Return fares would address Objective 2, ensuring that passengers using peak services pay fares that reflect the costs of providing peak capacity, and Objective 3, encouraging efficient use of available capacity.

8.25 If it is decided that looser regulation of the regulated off-peak return fare should be pursued further, we recommend that:

- These fares be either removed from regulation or put in a separate fares basket

- Average fares in the separate basket, if adopted, be allowed to increase at 7% percentage points per annum faster than other regulated fares, initially for two or three years, and the overall effect be monitored before deciding whether to continue the higher rate of indexing or to remove the tickets from regulation.

9 Option 8, an Absolute Fares Cap by Ticket Type

Introduction

9.1 This option would address two issues, the Objective 6 issue of "fairness" between regions and routes, and other anomalies discussed in paragraphs 3.33 to 3.36.

9.2 In devising options in Chapter 5 we described, but did not consider further, the option of a standardised national fares system. Immediate movement to standardised fares, or to maximum fares at any given distance, could mean extreme changes in fare, in either direction, for some flows, or on whole corridors.

9.3 A possible variation would be to modify the RPI-X mechanism to allow fares on flows with low yields to be increased faster than others, at least up to a standardised cap on each regulated fare at any given distance. A number of variations on this option are possible, but in principle:

- Fares already above the cap would continue either to be regulated at RPI-X or, optionally, could be regulated downwards in real terms until they were no higher than the cap.
- Fares below the cap could be allowed to increase by several percentage points above RPI-X up to a maximum of the cap.

Modelling

9.4 We assumed, for illustrative purposes, that an absolute cap would be set at the ninetieth percentile pence per mile level of three currently regulated fares. We assumed that fares below the cap would be permitted to rise towards it as shown in Table 9.1. These caps explicitly set the season ticket fare cap, permitting travel at peak times, at around half as much again as the Off-Peak Return fare cap.

TABLE 9.1 MODELLING AN ABSOLUTE FARES CAP BY TICKET TYPE

	Anytime	Season	Regulated off-peak return (Saver)
Level of cap	The higher of: £0.44 per mile or £4.40 single fare	The higher of: £0.33 per mile or £33.00 per week	£0.25 per mile
Extra revenue 2010	£40 million	£25 million	> £1 million
Overlapping Options	Option 1	Options 1 and 2	Option 3

9.5 Our analysis was completed using price elasticities of demand already established in the Passenger Demand Forecasting Handbook 5.0 (PDFH5), rebased according to the current rate per mile for each flow and ticket type and modified to rise with an elasticity to fare level of 0.6. Increases were applied to fares until this elasticity reach -1.0 or the fare cap was reached, whichever came first.

9.6 Table 9.1 shows that the largest potential gain in revenue would be through increases in regulated Anytime fares at shorter distances. A uniform cap of £0.44

per mile would raise an additional £40 million per annum, although at least part of this figure duplicates the proposed effect of raising Anytime fares as part of the peak-spreading measures examined in Option 1. In addition, many Anytime fares relate to travel in the London Travelcard area and could only be increased through coordination with TfL.

9.7 The next largest potential gain in revenue would be through increases in season ticket fares. A uniform cap of £0.25 per mile, already tested in Option 2, would raise an additional £15 million per annum, and a uniform cap of £0.33 per mile would raise an additional £25 million per annum. Note, however, that raising season ticket fares to this level would involve increases of well over 100% for at least some existing fares.

9.8 Raising the Off-Peak Return fare to a uniform cap of £0.25 per mile would, at first sight, raise less than £1 million per annum, principally because gains in the shoulder peak would be offset by losses in the Off-Peak. However, in practice we assume that while operators would take advantage of the headroom to raise the fare in the shoulder peak they would offer further discounted Super Off-Peak and Advance products in the off-peak. We therefore assume that the benefit of raising the Off-Peak Return fare would be at least some of the £20 million per annum estimated for Option 3 in paragraph 8.20.

9.9 We applied a further adjustment to take into account the estimated effect of operators raising fares quasi-regulated by the fares to which a new cap would be applied.

9.10 With these adjustments taken into account, the modelling suggested that application of consistent national fares caps on this basis and at these levels would raise around £100 million per annum nationally at current revenue levels. A major concern, however, is the rate at which it might be necessary to raise some individual fares. Achieving a 100% increase in some season ticket fares before the end of CP5, for example, would imply annual fares rises of around RPI+10% from January 2012 to January 2018 inclusive.

9.11 Nonetheless, assuming for illustrative purposes that implementation could begin with the January 2012 fares rise, and be completed over a period of seven years with the January 2018 fares rise, the additional revenue in the final year of CP5 would be around £130 million and the cumulative revenue gain by then would be around £500 million.

Issues and implementation

9.12 We stress that the above analysis is not a recommendation but an estimate of the effect of illustrative assumptions, which could be changed. As with the value of X in RPI-X, the level at which the fares caps are set is not rooted in any particular calculation, and would be a policy decision for Government.

9.13 Implementation would, however, raise a number of issues:

- Decision on the level of the cap and the maximum rate at which fares were allowed to rise towards it.

- Ensuring that any incremental revenue was returned to DfT rather than captured by the operators.

Conclusions and recommendations

9.14 Allowing regulated fares to rise more rapidly towards standard distance-based national caps would help address Objective 2, ensuring that passengers using peak services pay fares that reflect the costs of providing peak capacity, Objective 3, encouraging efficient use of available capacity, and Objective 6, fairness between passengers currently paying different regulated fares for journeys of the same length.

9.15 Our analysis shows that there is scope to raise considerable additional revenue by allowing fares to move upwards towards a more consistent national cap, both addressing issues of "fairness" between locations and allowing the elimination of some anomalies. This approach would achieve some of the benefits of a standardised national fares system, described in Chapter 5, without foregoing the revenue benefits of allowing fares to be fine-tuned to levels sustainable in local markets.

9.16 However, decisions would be needed on the range of fares to which the new caps would apply, the level at which they would be set, and the rate at which existing fares would converge with them. Decisions would be needed not only on season tickets, as in Option 2, and Off-Peak Return fares, as in Option 3, but also on regulated Anytime fares, where the analysis shows that the greatest additional revenue could be obtained.

9.17 If it is decided that a system of national standard caps should be introduced on some or all regulated fares, we recommend that:

- As with Option 1, exploratory discussions be held with TfL to share thinking and to discuss the likely scope for agreement on movement to higher Anytime fares.
- As with Option 2, additional analysis be carried out to examine the likely location and number of long-distance season ticket holders who would be affected by the proposed increases, and consideration be given to a "hardship" scheme.

10 Option 9, the Composition of the Fares Basket

Introduction

10.1 This option relates to a review of the composition of the fares basket, and in particular:

- The sub-options of subdivision, contraction or expansion
- The effects of different values of X, in RPI-X, in different parts of the basket
- The effects of wider "flex" to increase individual fares by more than X

10.2 Restructuring of the fares basket might potentially assist with the delivery of any of our proposed new objectives for fares regulation set out in Table 4.2.

Our analysis

10.3 We examined a paper by the Institute for Transport Studies, Leeds, which concluded that a fares basket should be drawn widely, and that any restriction on the maximum rise of individual fares within it would both reduce revenue and increase welfare loss, because its effects would be to force operators to transfer fare rises from inelastic to elastic markets.

10.4 Other approaches to the structure of the fares basket could be used to target different objectives.

10.5 Our analysis identified a number of other reasons why it may be desirable or necessary to restructure fares baskets, some of which are implicit consequences of other options we set out in Table 5.1, including:

- Extension of regulation to off-peak fares, and potentially shoulder peak fares, to enforce price differentials designed to encourage peak-spreading
- Separate regulation of season tickets, potentially in distance bands, to reduce the current taper at longer distances
- Separate regulation or removal of the Standard Off-Peak Return or "Saver"
- Extension of regulation to all fares through an absolute fares cap
- Extension of regulation to more or all Anytime fares
- Relaxation or removal of the constraints on setting individual fares within the basket

Modelling

10.6 We examined the effects of possible changes in fares models for four operators:

- First Great Western, a long-distance operator with a substantial London commuter market
- First Capital Connect, a London commuter operator
- London Midland, with a mix of commuter and long-distance flows such as between London and Birmingham
- Northern Rail, a regional operator with commuter flows into major cities

10.7 These models use the latest, 2011, fares baskets and base revenue for 2009/10. The impacts for these operators were then used to produce a national estimate.

10.8 Our analysis was completed using price elasticities of demand already established in the Passenger Demand Forecasting Handbook 5.0 (PDFH5), modified to rise with an elasticity to fare level of 0.6, meaning that there were diminishing returns from continually increasing the same fares.

10.9 We examined a range of sub-options against a base in which the current arrangements would continue with a regulatory fares cap of RPI+3% in January 2012 to 2014 and RPI+1% thereafter.

10.10 We selected four specific sub-options and estimated the approach that operators would use to maximise revenue within the remaining constraints on their ability to do so. We assumed that they would generally apply the greatest increases to regulated fares which quasi-regulated large amounts of other revenue or where price elasticities were lowest. We also took into account the consequent opportunities to change quasi-regulated fares, and the need to make compensating reductions in other fares to remain within the overall fares cap.

10.11 The results of our analysis are summarised in Table 10.1.

TABLE 10.1 FARES BASKETS SUB-OPTIONS

<table>
<tr><th></th><th></th><th>Current</th><th>1</th><th>2</th><th>3</th><th>4</th></tr>
<tr><td colspan="7">Sub-option</td></tr>
<tr><td rowspan="2">Baskets</td><td>Other regulated fares</td><td colspan="2" rowspan="2">RPI+3%</td><td colspan="3">RPI+3%</td></tr>
<tr><td>Season tickets</td><td>RPI+3%</td><td colspan="2">RPI+5%</td></tr>
<tr><td rowspan="2">Maximum “flex”</td><td>Other regulated fares</td><td rowspan="2">+5%</td><td rowspan="2">No cap</td><td colspan="2">+5%</td><td>No cap</td></tr>
<tr><td>Season tickets</td><td colspan="2">+5%</td><td>No cap</td></tr>
<tr><td colspan="7">Additional revenue relative to current (million)</td></tr>
<tr><td colspan="2">At end of CP5</td><td></td><td>+£80</td><td>-£5</td><td>+£80</td><td>+£150</td></tr>
<tr><td colspan="2">To end of CP5</td><td></td><td>+£350</td><td>-£35</td><td>+£350</td><td>+£750</td></tr>
</table>

10.12 Season tickets are not currently in a distinct basket, enabling operators to apply the current RPI+3%, with an additional +5% “flex” on any individual fare, to increase the price of season tickets faster than other fares.

10.13 Sub-option 1 involves removing the +5% cap on the “flex” on any individual fare, allowing operators freedom to redistribute price rises within the basket. We estimate that this would result in additional revenue of £80 million in the last year of CP5 and a cumulative revenue gain of £350 million by the end of CP5.

10.14 Sub-option 2 involves creating a separate basket for season tickets but otherwise preserving the current arrangements. This would reduce the operators’ freedom to increase the price of season tickets faster than other fares and hence reduce overall revenue growth. We estimate that this would result in £5 million less

revenue in the last year of CP5 and a cumulative £35 million less revenue by the end of CP5.

10.15 Sub-option 3 modifies sub-option 2 to give additional scope to increase season ticket prices, by raising the permitted average rise in the season ticket basket from RPI+3% to RPI+5%, which would be sustained until the January 2019 fares rise. We estimate that this would result in additional revenue of £80 million in the last year of CP5 and a cumulative revenue gain of £350 million by the end of CP5.

10.16 Sub-option 4 modifies sub-option 3 by removing the +5% cap on the "flex" on any individual fare in all baskets, allowing operators freedom to redistribute price rises within each basket. We estimate that this would result in additional revenue of £150 million in the last year of CP5 and a cumulative revenue gain of £750 million by the end of CP5.

10.17 Sub-option 2 appears unlikely to achieve the objective of raising additional revenue, because it would limit the operators' ability to focus fare rises on season tickets, for which the price elasticity of demand is relatively low. The greatest potential for additional revenue would be if operators were given wider freedom to distribute the fares rises, in sub-options 1 and 4.

10.18 Our analysis below continues on the basis of sub-option 1, in which the only change to existing arrangements is the removal of the +5% cap on the "flex" on any individual fare.

Issues and implementation

10.19 Implementation of sub-option 1 would be relatively simple, subject to the need for DfT to negotiate with operators to recover as much as possible of the additional revenue they would be able to collect.

Conclusions and recommendations

10.20 Changing the composition of the fares basket would help address Objective 2, ensuring that passengers using peak services pay fares that reflect the costs of providing peak capacity, and Objective 3, encouraging efficient use of available capacity.

10.21 Given complete freedom to redistribute fares increases within the overall basket, operators might raise at least some individual fares by a very large amount by the end of CP5, particularly in inelastic markets. However, basket regulation ensures that at least some fares would be reduced to compensate.

10.22 If it is decided that greater flexibility should be given to operators to vary individual fares within the basket, we recommend that:

- Further work be carried out to examine the extent to which this might be exploited.
- Consideration be given to continuing to apply some mitigating constraint on the rate at which individual fares may change.

11 Option Assessment

Introduction

11.1 In this Chapter we summarise:

- Our assessment of the Options, taking into account their financial impacts and their performance against our proposed objectives for fares regulation
- Distributional issues
- Implementation issues, including timing and speed and the need to ensure that additional revenue is returned to the taxpayer and not captured by operators

11.2 We also indicate the nature of the economic impacts of the Options, noting that fares increases will lead to economic disbenefits for passengers.

11.3 Our remit asked us to identify the revenue, distribution and implementation impacts of the Options, and we were specifically asked to quantify the revenue impacts of each Option, recognising that there will be a substantial uncertainty in the results, for example, due to elasticities being applied to very large fares changes.

11.4 Our remit did not extend to costs, and so we were unable to complete a cost/benefit analysis of each Option.

11.5 We assessed the impact of the Options over a period covering the remainder of regulatory Control Period 4 (CP4) to April 2014 and Control Period 5 (CP5) to April 2019. We stress that our quantitative estimates should be treated as indicative only, for reasons we discuss below.

Additional revenue

11.6 We agreed that we would assume, for illustrative purposes, that in the absence of other changes the regulatory fares cap would be RPI+3% in January 2012 to 2014 and RPI+1% thereafter, resulting in a cumulative real rise in the cap of almost 15% between January 2011 and January 2019.

11.7 Table 11.1 overleaf, summarising our assessment, therefore includes estimates of the incremental revenue in one year at the end of CP5, notionally 2018/19, and the cumulative additional revenue to the end of CP5, or 2018/19 inclusive, available from each option. For clarity, for Options 1-3 and 8 our estimates of incremental revenue are additional to the effects of RPI+3%/1%. For context:

- The cumulative effect of the 15% rise in the regulatory fares cap will generate around £200 million additional revenue in 2018/19 and a cumulative total of around £1,000 million by that date.
- Allowing regulated fares to rise by an additional 1% per annum for 2015 to 2019 inclusive would generate around £60 million additional revenue in 2018/19 and a cumulative total of around £150 million by that date.

11.8 We were asked to provide an indication of the confidence limits of our quantitative analysis. Given the need to extrapolate from limited data and to test change much larger than the reliable range of established models, we suggest that

all our estimates of additional revenue should be taken to have a margin of error of at least a factor of two in either direction. In particular:

- For Options 2, 8 and 9, confidence intervals would be narrower if the scale of fares rises were reduced
- For Option 1, the results depend on a range of new assumptions and estimates not yet supported by detailed research
- For Option 3, as described in Chapter 8, we have only been able to make an indicative estimate with the available data

TABLE 11.1 ILLUSTRATIVE REVENUE IMPACTS OF OPTIONS

Option	1	2	3	8	9
	Peak-spreading	Price taper on season tickets	Standard Off-Peak Return	Absolute fares cap by ticket type	Composition of the fares basket
Note: Option 1 is conditional on TfL, Option 8 overlaps with Options 2 and 3					
Additional rise in regulated fares, above RPI+3% 2012 to 2014 and RPI+1% to 2019					
Number of years of additional increase	5	7	5	7	Operator decision
Additional annual rise in total fare basket	+2.3%	+0.5%	+1.4%	+1.9%	None
Additional annual rise in highest-rising fare	+7%	+9%	+7%	+10%	Operator decision
Total additional rise in highest-rising fare	+40%	+80%	+40%	+100%	Operator decision
Indicative additional revenue, at 2010 prices (million)					
In 2018/19	£200	£20	£25	£130	£80
Cumulative to 2018/19	£500	£80	£125	£500	£350

Performance against objectives

11.9 All of the Options provide some protection against abuse of market power by placing limits on fare rises. However, to the extent that higher increases than RPI+3%/1% are allowed, this permits some controlled exploitation of market power in the interests of meeting other objectives and of raising revenue and hence reducing the net cost of the railway to the taxpayer.

11.10 All of the Options would help to address Objective 2, ensuring that passengers using peak services pay fares that reflect the costs of providing peak capacity, and to a greater or lesser extent Objective 3, encouraging efficient use of available capacity.

11.11 The performance of Option 1 against Objective 3 would be dependent on it being applied to all users of rail services, including holders of TfL Travelcards. A reduction in peak demand of only a few percent might seem small, but the costs of schemes such as Thameslink and Crossrail suggest that each incremental expansion of rail capacity around London by 10% could cost of the order of £10 billion.

11.12 In addition Options 2 and 8, in particular, would address Objective 6, fairness between commuters and other passengers. Option 2 would also support sustainability by discouraging long-distance commuting: daily commuters living 60 miles from their work travel over 25,000 miles a year, equivalent to at least one trip round the world. Option 8 would address fairness between passengers currently paying different regulated fares for journeys of the same length and nature.

Economic impacts

11.13 We discuss in turn below the various economic impacts of the proposed options:

- Transfers of revenue from passengers to operators and hence DfT and taxpayers
- Disbenefits to passengers and elsewhere in the economy
- Benefits to passengers through reduced crowding, where material
- Potential for savings in operating and capacity expansion costs

Transfers

11.14 An increase in regulated fares, whether through the RPI-X regulatory formulae or through specific Options, will transfer revenue from passengers, in the first instance to operators, but potentially to DfT and hence the taxpayer. The benefit of additional revenue from passengers who continue to pay the higher fare creates an equal and opposite disbenefit to the same passengers.

Benefits and Disbenefits

11.15 The total social and economic disbenefits of fares rises exceed the additional revenue, because two further types of disbenefits result from increasing fares:

- Disbenefits to, and loss of revenue from, passengers who are priced off rail.
- Negative externalities, in particular through some passengers priced off rail switching to car travel, with an associated increase in road congestion, accidents and carbon dioxide (CO_2) emissions.

11.16 Two Options are designed to generate benefits through reduced levels of crowding at any given level of demand and capacity:

- Option 1, reducing crowding on commuter services through peak-spreading.
- Option 3, reducing crowding on long-distance services through removing spurious peaks, through looser regulation of the Standard Off-Peak Return. Option 8, which subsumes Option 3, should also reduce crowding disbenefits.

11.17 In practice, the modelling of Option 1 on different routes and service groups suggests that the benefits of reduced crowding are unlikely to offset more than 10-20% of the disbenefits described in paragraph 11.15.

11.18 These Options will also result in an offsetting disbenefit to passengers of the net displacement in their journey time to spread the peak. This cannot be estimated with current data, which does not identify by how much passenger journey time has already been displaced by crowding. We would expect there to be regressive distributional effects, with poorer passengers generally less likely to be able to change the time at which they travel to avoid high peak fares.

Cost savings

11.19 The identification and quantification of the potential cost savings is beyond the scope of this study.

11.20 Any increase in fares will result in at least some reduction in demand, and Option 1, peak-spreading, has a specific objective of reducing high peak demand which drives overall capacity.

11.21 However, our assessment assumes that sufficient capacity will be available to handle the forecast growth in demand over the period to the end of CP5, implicitly including some investments in rolling stock and/or infrastructure not yet committed or possibly not yet even identified. If demand is constrained by lack of capacity, then it may not be possible to obtain all the estimated incremental revenue.

11.22 In Chapter 6 we noted that peak-spreading could reduce average high peak demand by at least 5% which, while there would be variations between corridors, would not normally be sufficient to allow any reduction in the length or number of high peak trains.

11.23 The principal benefit of reduced high peak demand would therefore be to carry more passengers within existing levels of crowding before requiring further expansion of the infrastructure. A 5% reduction in peak demand might typically allow deferral of infrastructure investment to expand capacity by around two years, but identification and quantification of the potential savings is beyond the scope of this study.

11.24 Network Rail[4] provided a number of comments on our analysis, suggesting that:

- The scale of the reduction in peak demand is unlikely to make it possible to delay or avoid infrastructure works at major constraints (for example, the throat of London Waterloo), as the timing of these works is generally determined by life expiry of assets (particularly signalling) rather than by the level of passenger demand
- In at least some cases there would be a need for additional rolling stock in the shoulder peak, and hence potentially further operating costs such as train crew, cleaning and maintenance staff and infrastructure costs such as depot and stabling facilities

[4] On 2 February 2011

Summary

11.25 In summary, all the Options would result in net disbenefits from passengers being priced off rail, but the scale of offsetting benefits or cost savings may be limited.

11.26 We noted in paragraph 11.8 that all our estimates of additional revenue should be taken to have a margin of error of at least a factor of two in either direction. Furthermore, the relative disbenefits of RPI-X increases in each Option would depend on differences in the impacts in different markets, and appraisal techniques based on average effects may not be applicable. Nonetheless we have provided the study steering group with a working paper with the implications of applying standard WebTAG guidelines.

11.27 We would expect the relative proportions of the benefits and disbenefits to vary in practice.

11.28 For example, we would expect that Option 8, raising inter alia Anytime and Off-Peak Return fares, would result in more additional car miles per passenger mile priced off the railway than with Option 2, raising long-distance season ticket prices. This is because car travel is not a practical alternative for most long-distance rail commuters. However we would also expect that Option 2, by increasing the cost of commuting, may limit access to employment and deter at least some current commuters from working, with a consequent loss of economic activity.

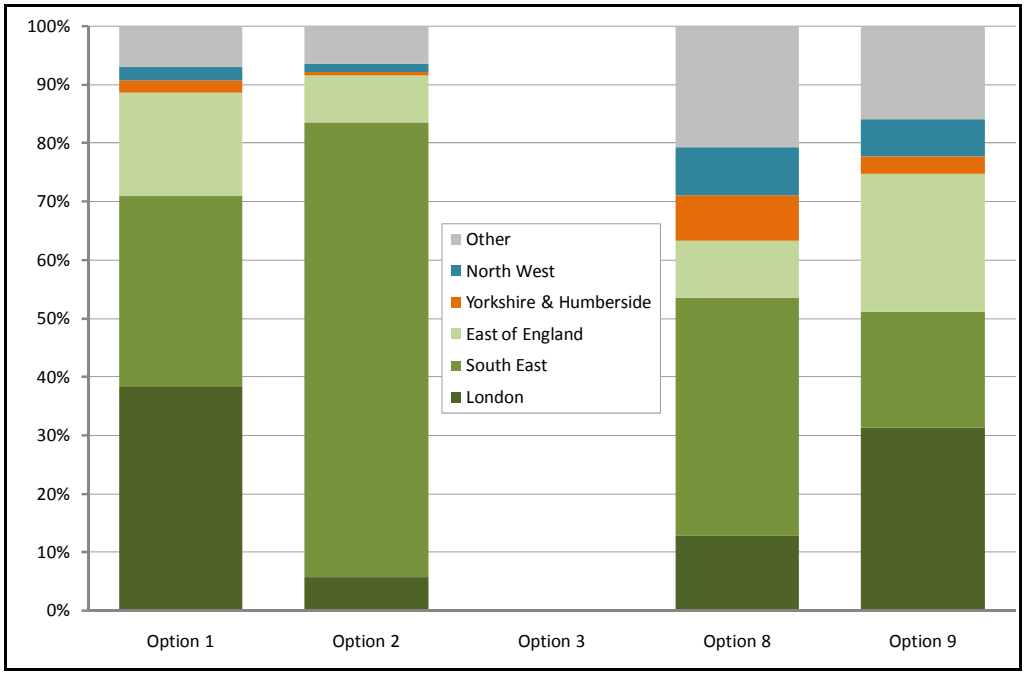
Distributional issues

11.29 Where capacity is constrained, existing techniques of market segmentation and yield management, and potential new techniques such as peak-spreading, are likely to have regressive distributional effects among passengers, with capacity being allocated to those most willing to pay and denied to those least able to pay. This effect could be examined in detail only if consistently reliable data were available on the incomes of buyers of individual ticket.

11.30 We have, however, developed indicative estimates of the regional distribution of the impacts of Options 1, 2, 8 and 9, although our conclusions depend in part on modelling from a sample based on only part of the network. For Option 3 we have no evidence, from the limited data available, of the overall regional distribution of the impacts.

11.31 Figure 11.1, which summarises our findings, shows the estimated additional revenue based on the Government Office Region (GOR) in which tickets have been sold.

FIGURE 11.1 ADDITIONAL REVENUE BY GOVERNMENT OFFICE REGION



Source: Steer Davies Gleave analysis

11.32 In all Options, the majority of the additional revenue would be generated in London, the South East and the East of England. There are, however, significant differences between the Options.

11.33 Option 1, focusing on peak spreading, raises revenue principally in commuter markets. Almost 90% of the total additional revenue would be generated in London, the South East and the East of England.

11.34 Option 2 focuses on long-distance season tickets, a large majority of which are held by commuters living within the South East. This accounts for around 80% of the additional revenue, particularly if sales apparently in London, but likely to be to "country" commuters buying tickets at the London end, are taken into account. With the East of England, these regions again account for 90% of the total additional revenue.

11.35 Option 8, in contrast, raises only just over 60% of the additional revenue in these areas, with material contributions from other regions and in particular Yorkshire and Humberside and the North West. This reflects how the additional revenue generated by allowing fares to move towards a uniform cap is likely to emerge predominantly from regions where fares are currently lower than average.

11.36 Option 9 allows operators in all regions greater flexibility to raise fares, but their ability to do so depends on the relative willingness to pay in the markets they serve. Our analysis of their possible behaviour suggests that around 75% of the additional revenue would be obtained from London, the South East and the East of England, and around 25% from other regions in which price elasticities of demand may be higher.

11.37 This analysis relates to revenue, but we would expect the regional distribution of the generally larger passenger disbenefits and highway disbenefits to be broadly

similar. There would, however, be more complex distributional issues between passengers within a region. With Option 1, for example, we noted in paragraph 11.18 that we would expect there to be regressive distributional effects, with poorer passengers generally less likely to be able to change the time at which they travel to avoid high peak fares.

Implementation issues

11.38 Options 1, 2 and 3 are largely independent of each other but, as noted in Table 11.1, Option 8 subsumes Options 2 and 3 by allowing at least the same increases in the same regulated fares. The effects of Option 9 are more difficult to predict, and would depend on how operators chose to use the additional pricing flexibility, but the effects would almost certainly overlap with those of Options 2, 3 and 8.

11.39 This suggests that three broad approaches to implementation might be possible:

- Addressing specific issues through any or all of Options 1, 2 and 3
- Giving operators greater freedom specifically to increase relatively low fares, and hence remove pricing anomalies, through Option 8
- Giving operators wider freedom in how and where to raise fares, through Option 9, with the implicit expectation that the outcome would be driven by their efforts to maximise revenue

11.40 The timing and speed of implementation would be constrained by three distinct factors:

- The need to develop the Options further technically and to agree an approach with other stakeholders. This issue applies primarily to peak-spreading Option 1, and we have assumed that the other Options could probably be implemented from January 2013.
- The potential need to ensure that year-on-year rises in individual fares are not excessive, which can be applied to any Option by reducing the maximum permitted annual rise and extending the implementation period. We have illustratively assumed that all the Options could be implemented by January 2019, over at most seven fares rises, as shown in Table 11.1.
- The need to obtain good value for money for the taxpayer when negotiating with existing franchisees, which we discuss below.

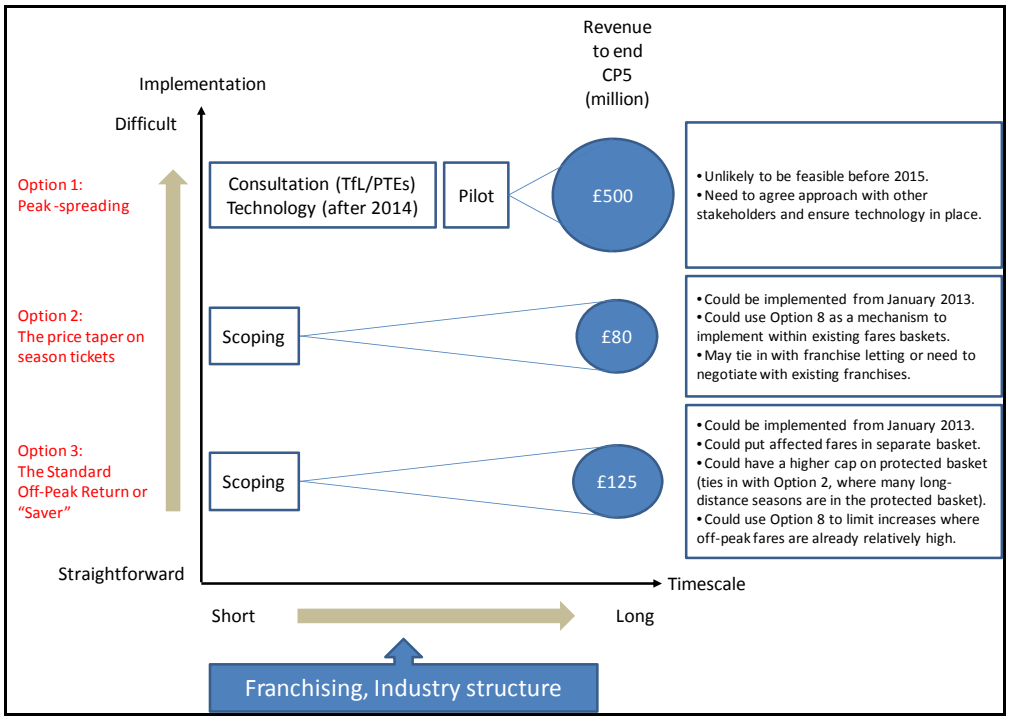
11.41 Implementation of any of the Options within the life of existing franchises would require negotiation with franchisees, with the aim of reaching an agreement close to “No Net Loss/No Net Gain” (NNL/NNG) for the franchisee. However, our experience is that franchisees are likely to argue that the additional revenue from the proposed changes is limited. It would be poor value for money to incur the economic disbenefits of higher fares but to let a large part of the potential revenue gains be captured by incumbent operators.

11.42 Negotiation with existing franchisees may offer better value for money where the potential to increase revenue can be estimated with higher confidence. This is most likely to be the case for small changes and in areas where elasticities are well-understood.

11.43 Negotiation with existing franchisees is less likely to offer good value for money where they are aware, can deduce, or can show that the estimated gains are subject to considerable uncertainty. Under these circumstances there is a risk that a relatively large proportion of the additional revenue would be captured by the franchisees rather than benefitting the taxpayer. It may therefore be better value for money to defer implementation until franchises are re-let.

11.44 Figure 11.2 summarises elements of the above analysis, and compares the different issues and potential timescales associated with implementation of, for illustrative purposes, Options 1, 2 and 3.

FIGURE 11.2 IMPLEMENTATION OF OPTIONS 1, 2 AND 3: ILLUSTRATIVE ISSUES



Source: Steer Davies Gleave

12 Recommendations

Introduction

12.1 We summarise below the recommendations associated with each of the five Options examined in Chapters 6 to 10 and assessed in Chapter 11.

12.2 The scale of changes we have described and modelled is intended as an illustration and should not be interpreted as a recommendation.

12.3 Option 1 has been designed to meet a specific operational objective, of balancing demand across peak and shoulder peak capacity as evenly as possible. Notwithstanding the uncertainties in the associated modelling, our estimates of the revenue and economic impacts of the Option are driven by this assumption.

12.4 All other Options require a policy input on the extent and speed of change which will be permitted.

12.5 It would be for Government to decide by how much they wished to increase fares, how fast, and with what mitigating measures, and whether implementation should begin during existing franchises, which might offer poor value for money, or deferred until they are re-let.

Option 1, peak-spreading

12.6 If it is decided that peak-spreading should be pursued further, we recommend that:

- Exploratory discussions be held with TfL to share thinking and to discuss the likely scope for agreement on movement to a common peak-spreading fares structure, and in particular any critical technological issues.
- Additional work be carried out by Network Rail to identify if and where peak-spreading could allow capacity expansion schemes to be deferred or avoided.
- Additional research be carried out to improve modelling of passenger reaction to changes in crowding levels and fare, particularly over the longer term. One area which could be examined is whether and by how much demand peaks narrow after capacity expansion, either on national rail or on TfL services.
- Additional analysis be carried out to validate our initial thinking, to identify the practical issues in more detail, and to develop a more detailed working proposal on how, when and where peak-spreading could be implemented and incorporated into the franchise model.
- The effect of the implied move to “pay as you go” and hence single leg pricing throughout the peak-spreading area be investigated.

Option 2, the price taper on season tickets

12.7 If it is decided that the price taper on season tickets should be reduced, we recommend that:

- Additional analysis be carried out to examine the likely location and number of long distance season ticket holders who would be affected by the proposed increases.
- If necessary, consideration be given to a "hardship" scheme, establishing a register of holders of long period season tickets at a certain date, for whom prices would continue to be regulated at an lower level. As with existing schemes for discounted travel to current and former rail industry employees, such a scheme would need careful design to avoid fraud and to ensure that the pool of beneficiaries declined over time.
- More detailed modelling be carried out of the additional revenue which could be obtained by each operator, with a view to permitting existing franchisees to raise season ticket fares but to return the additional revenue to DfT on a "No Net Loss/No Net Gain" (NNL/NNG) basis.

Option 3, the Standard Off-Peak Return or "Saver"

12.8 If it is decided that looser regulation of the regulated off-peak return fare should be pursued further, we recommend that:

- These fares be either removed from regulation or put in a separate fares basket
- Average fares in the separate basket, if adopted, be allowed to increase at 7% percentage points per annum faster than other regulated fares, initially for two or three years, and the overall effect be monitored before deciding whether to continue the higher rate of indexing or to remove the tickets from regulation.

Option 8, an absolute fares cap by ticket type

12.9 If it is decided that a system of national standard caps should be introduced on some or all regulated fares, we recommend that:

- As with Option 1, exploratory discussions be held with TfL to share thinking and to discuss the likely scope for agreement on movement to higher Anytime fares.
- As with Option 2, additional analysis be carried out to examine the likely location and number of long-distance season ticket holders who would be affected by the proposed increases, and consideration be given to a "hardship" scheme.

Option 9, the composition of the fares basket

12.10 If it is decided that greater flexibility should be given to operators to vary individual fares within the basket, we recommend that:

- Further work be carried out to examine the extent to which this might be exploited.
- Consideration be given to continuing to apply some mitigating constraint on the rate at which individual fares may change.

A possible package for further consideration

12.11 A possible package for further consideration would be a combination of Options 1, 2 and 3, which address specific issues:

- Option 1 will potentially improve the efficient use of available capacity on high peak commuter services, but considerable additional work will be required before feasibility can be confirmed and a specific scheme can be recommended.
- Option 2 will address anomalously low fares, and help ensure that peak fares reflect the cost of peak capacity, but the actual level to which regulated season ticket fares should rise is a decision for Government.
- Option 3 will potentially improve the efficient use of available capacity on shoulder peak long distance services, but again the constraint on the actual level to which regulated Off-Peak Return and Super Off-Peak Return fares should rise is a decision for Government.

12.12 The collective revenue impact of these options should be close to the sum of the estimates provided in Table 11.1.

APPENDIX

A

LITERATURE REVIEW

A1 LITERATURE REVIEW

Introduction

A1.1 Our terms of reference required a literature review which we identified in our proposal as Workstream 1.3. The table below lists the documents included in the Request for Quotation, referred to in our proposal, and subsequently added as we identified their relevance to this analysis.

Source	Request for Quotation	Proposal	Additional
"Fares Review", SRA, 2003	✓		
"Encouraging edge of morning peak travel", Passenger Focus, 2006	✓		
"Demand Management Techniques – Peak Spreading", Faber Maunsell for DfT, TfL and Network Rail, April 2007	✓		
"Saver Fares: Differentiation and Potential Deregulation", Faber Maunsell/AECOM for DfT, July 2007	✓		
Evidence to the Transport Select Committee, 2006 and 2009	✓		
"Optimum fares regulation for Britain's railways", Institute for Transport Studies, Leeds, March 2007		✓	
"Comparisons between fares and ticketing in Britain and continental Europe", Steer Davies Gleave for Passenger Focus, February 2009		✓	
"Regional commuter fates and ticketing comparisons in Great Britain", Steer Davies Gleave for Passenger Focus, January 2009		✓	
"International comparisons of rail networks and policy lessons for Scotland", Steer Davies Gleave for Transport Scotland, December 2006, showing proportions of costs recovered by revenues			✓
"National Rail Trends 2009-2010 yearbook", 29 July 2010, Table 5.1 showing average change in rail fares			✓
TfL fares 2011			✓

A1.2 Inclusion above does not necessarily mean that we have carried out a comprehensive review of a document. Rather, in some cases, we have identified as document as presenting facts or making one or more points which may be relevant to this study.

A1.3 To avoid repetition, findings and analysis incorporated in the main body of this report have been omitted from this Appendix.

SRA fares review 2003

A1.4 Source document for this Chapter is "Fares Review Conclusions 2003" by the Strategic Rail Authority (SRA). We note that the SRA intended to publish a technical annex "in due course" but have not examined any more extensive report which might exist.

Key points and conclusions

A1.5 The review followed consultation, attracting 1,800 responses, on what fares should be regulated, by how much they should rise, linkage between fares and performance and mechanisms for fare regulation. It resulted in a reversal in the indexing of real fares from RPI-1% to RPI+1%, the removal of a linkage between fares and performance, and simplification of the mechanisms for regulation. It also identified a number of problems with the regulation of Saver fares for off-peak leisure travel over about 50 miles.

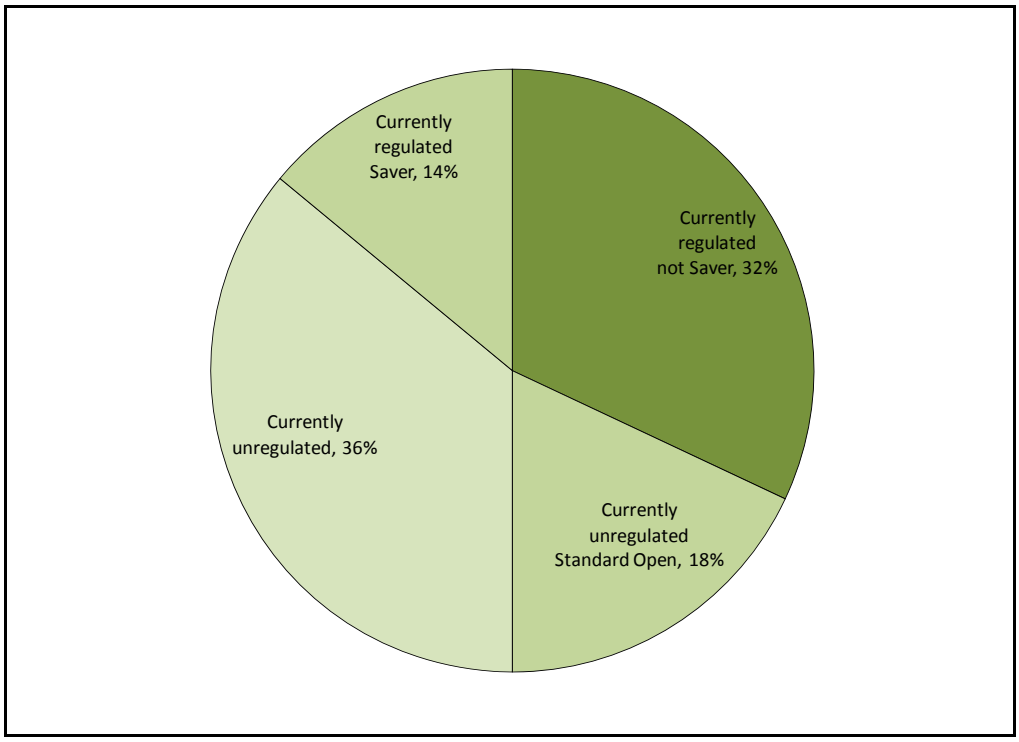
A1.6 We have collated in the table below a sample of the comments and findings which may be material to the current study.

Key issues and findings	Page
"The regulation of Saver fares has constrained new and innovative, customer-focused tickets and has led to significant overcrowding on some routes." The SRA was working with a view to replace the existing regime by 2006.	8
"Standard Open Singles or Returns will not be regulated" except where they are already.	8
70% of commuters into central London use rail: 39% national rail and 31% tube.	9
"A "reasonable" and economically efficient fare should at least reflect the full or marginal cost of provision." (Further definitions appear on page 14.)	10
"Standard Open Returns are typically used by business travellers."	10
Proportion of revenue currently regulated and with potential changes.	11
Estimates of the cost of running an extra London commuter train.	15
Conclusions on the structure of the fares regulation mechanisms going forward.	22
Number of flows required in a fares basket can probably be limited to 1,000.	23

Issues and illustrative findings

The proportion of revenue regulated

A1.7 The Figure below (based on data from Page 11) shows the proportion of revenue then regulated and which would be regulated with different proposals. If necessary, we could update this chart with more recent data.



A1.8 At the time, 46% of revenue was regulated, of which 14% was from Savers. Proposals examined included deregulating Savers and regulating Standard Open tickets.

Passenger Focus research on edge of peak travel

A1.9 Source document for this Chapter is "Edge of morning peak travel" research findings prepared for Passenger Focus by Consolidated, October 2006.

Key points and conclusions

A1.10 The paper presented the results of 173 "intercept" interviews at Waterloo station and a subsequent series of five focus groups, and its findings were therefore in principle specific to commuting through Waterloo. The research was qualitative rather than quantitative, but we have collated in the table below a sample of the comments and findings which may be material to the current study.

Key issues and findings: note that only 173 intercept interviews took place, and percentage response rates should be taken as indicative only.	**Page**
3 out of 10 people said they could be persuaded to arrive outside peak times.	6
Work commitments were the only significant factor stopping interviewees from arriving after 9am.	6
To motivate off-peak travel, 56% suggested reducing fares but 16% mentioned a more frequent off-peak service and 14% mentioned greater comfort.	6
Passengers were more prepared to be flexible in spring and summer, when earlier or later travel could take place in daylight.	6
Getting passengers to get up earlier will be very difficult, especially in winter.	7
It will be harder to persuade those with longer journeys to change their behaviour than those with shorter journeys.	7
Passengers strongly associated peak travel with "unreasonable" expense but did not tend to associate off-peak travel with cost saving.	8
Passengers reported that the key benefit of change in travel time would be optimisation of their leisure time. Financial reward was not "top of mind" but once mentioned became a dominant incentive. Discounts of 25%-30% were sought by passengers.	7
Passengers wanted to be rewarded for "good" behaviour rather than penalised for "bad" behaviour". The most popular option was a system which would reward the user with credit for travelling on certain trains. "Money back is better than reducing the price".	7 29

Issues and illustrative findings

A1.11 The surveys raise a number of issues including the reluctance of some passengers to consider travelling earlier, particularly in the dark, and the possibility that the scope for peak-spreading might be greatest in spring and summer, while demand is highest in autumn.

A1.12 The preference for a refund for "good" off-peak travel raises a number of issues:

- What would prevent a season ticket not only being "lent out" at weekends and during holidays, but also attracting a refund if only used off-peak? More widely, should or would "season" tickets become "bearer" tickets usable by different passengers at different times.
- What refund would be expected on days when no travel took place, such as when on holiday or sick?

A1.13 More widely, a new product might introduce new opportunities for fraud which would have to be considered and carefully monitored.

A1.14 In practice, the mindset of the passengers is the paid-in-advance fixed price season allowing unlimited peak travel at no marginal costs, relative to which they unsurprisingly would like discounts for off-peak travel. With PAYG the issue would disappear, as non-travel, off-peak, shoulder peak and peak travel could all be separately priced. A major potential disadvantage of PAYG, however, is that it

would seriously affect the cash flow and hence working capital requirements of the industry, as season ticket revenue would not long be obtained so far in advance. The current "auto top-up" arrangements enable passengers to pay only a small amount in advance.

A1.15 There was little discussion of how behaviour might change if existing constraints on working hours were relaxed, or whether potential variations in the cost of commuting would be used in negotiations with employers to obtain more flexible working hours.

Demand management techniques – peak spreading

A1.16 Source document for this Chapter is "Demand Management Techniques – Peak Spreading" by Faber Maunsell for DfT, TfL and Network Rail, April 2007.

Key points and conclusions

A1.17 Faber Maunsell carried out a literature review, covering some of the documents described elsewhere in this document, surveys of passengers and businesses, and stated preference work to identify the importance passengers attached to crowding, standing, changes in travel time and changes in fare. They then developed a model in which the utility of travel in different half hour bands was a function of generalised time, fare, crowding levels and displacement from the desired travel time.

A1.18 The model was used to estimate how passengers would respond to fares varying with time of travel in three corridors:

- London Waterloo, the South Western Main Line (SWML)
- London Paddington, the Great Western Main Line (GWML)
- Birmingham New Street, with services groups to Coventry and Wolverhampton

A1.19 Tests included:

- Fare surcharges of 25% and 50% when demand exceeds capacity
- Fare discounts of 25% and 50% before and after demand exceeds capacity
- Combinations of the above

A1.20 In each case, the model would iterate until near to an equilibrium in which no passengers could change their time of travel and reduce their generalised cost. The principal outputs were the resulting changes in average load factor of trains arriving in each 30-minute period from 07:30 to 10:00.

A1.21 We now have access to the model and expect to be able to make use of it in Part 2 of this study.

A1.22 One important limitation of the study is that it was limited to the analysis of how AM peak travel might be redistributed. In particular:

- It did not examine the extent to which lower shoulder-peak fares would either "attract in" passengers from the off-peak or require further reductions in off-peak fares

- In consequence, it did not identify the overall impacts on fares structures, particularly within London, which would be necessary to create the required differentials in fares without further unintended consequences

A1.23 The table below summarises a number of key points from the report.

Key issues and findings	Reference
Reviewing earlier work: "To be effective in influencing demand, it was concluded that the fare differential would have to apply to all passengers including season ticket holders." A 3% switch in travel (out of the peak) would require a peak/off-peak fares differential of 40% for commuters from outside London and 100% (sic) in Zone 3.	2.2
Surveyed passengers identified both preferred and actual times of travel. (It is not possible to extract this data from the report.)	Table 4.6 4.23
Surveyed passengers identified ticket type held.	Table 4.16
Fares differentials may be better targeted at shorter distance commuters to provide an incentive to avoid overcrowding and hence get a better quality.	4.4.7
Those most able to benefit from fares differentials are those with flexibility of travel time, who are likely to be high income.	4.5.6 9.2
Many employers allow or would allow staff sufficient flexibility to allow them to benefit from fares differentials.	5.6.4
Of those surveyed in London, in the morning peak: 34% arrive at their preferred time, 22% before it and 44% after it. 19% of those missing their preferred time do so due to crowding, but most do so due to timetabling and operational factors.	9.2
74% of the respondents, and 91% with journeys over 60 minutes, have a seat for their journey into London and, by implication, are little affected by crowding.	9.2
Of those surveyed in London, in the evening peak: 8% depart at their preferred time and most who do not travel after it. (The apparent implication is that passengers with long journeys may time shift considerably to be sure of a seat for their homeward journey.)	9.2
Significant penalties exist for changing time of travel. Significant percentage changes in fares are required to overcome this penalty. A combination of higher capacity, fare surcharges and fare reductions would be needed to produce behavioural change.	9.6

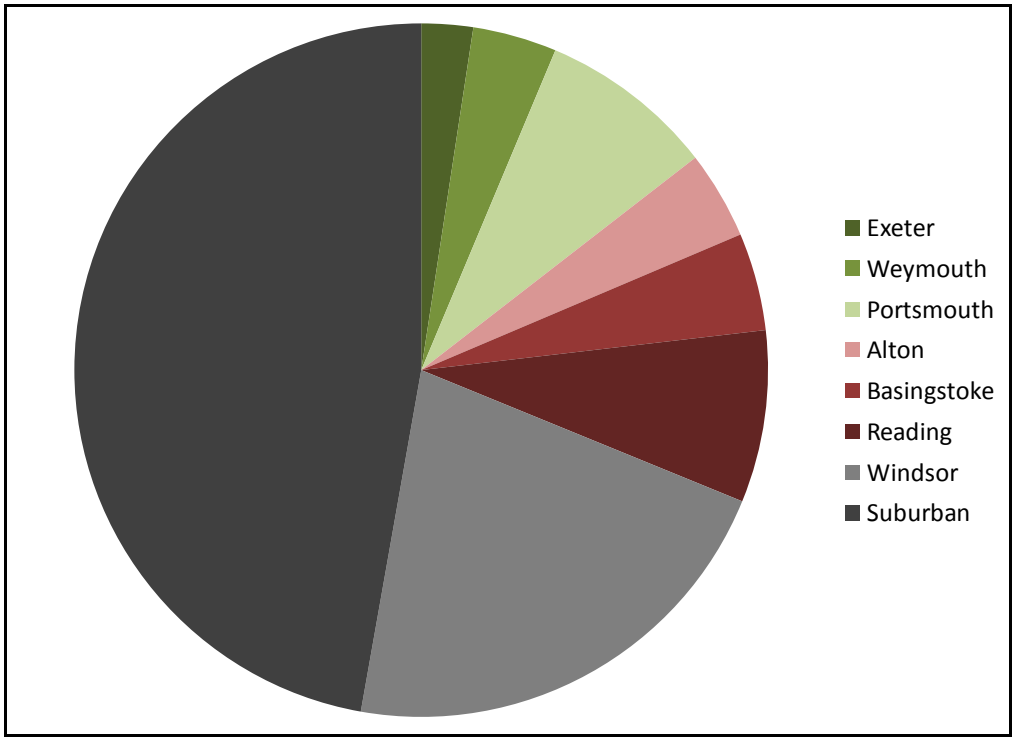
Issues and illustrative findings

A1.24 We have examined the report, and concluded that the analysis seems broadly robust, subject to the limitation noted above that there was no study of interactions between different fare types.

A1.25 We also extracted a number of analyses from the many tables provided.

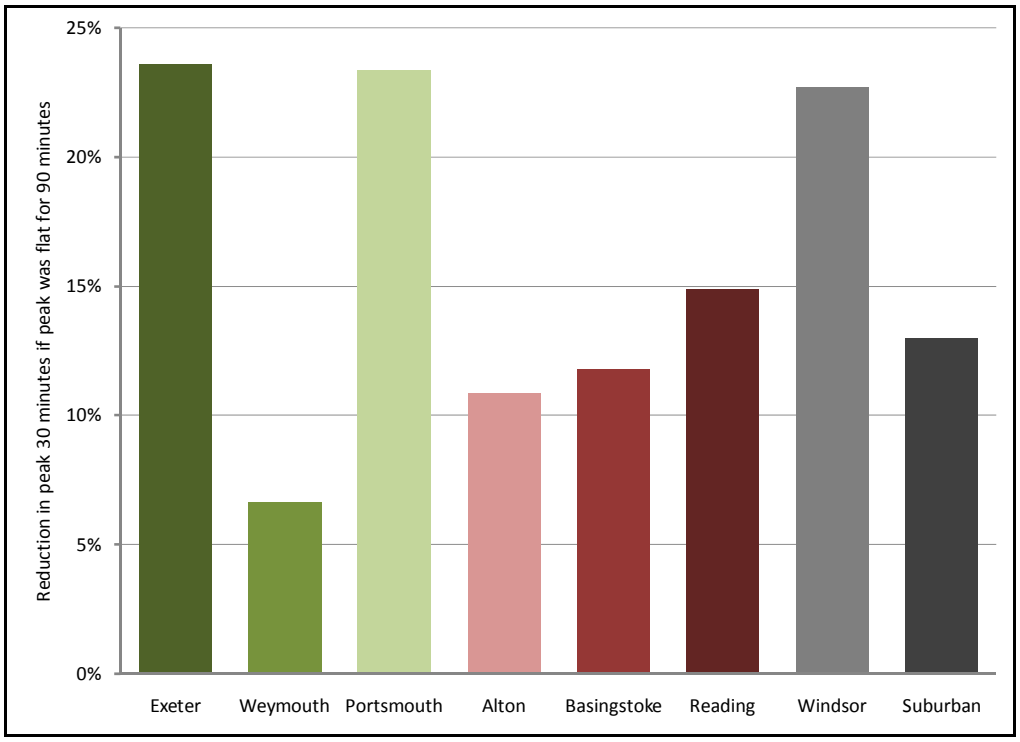
Mix of passenger demand into Waterloo

A1.26 The figure below summarises the number of passengers into Waterloo by service group. The analysis shows how passenger numbers are dominated by suburban services and the Windsor Lines, largely covered by TfL's zonal fares, which account for 69% of total demand. Fewer than 15% of passengers are on service groups extending more than 50 miles from London to Portsmouth, Weymouth and Exeter.



Scope for AM peak spreading on Waterloo services

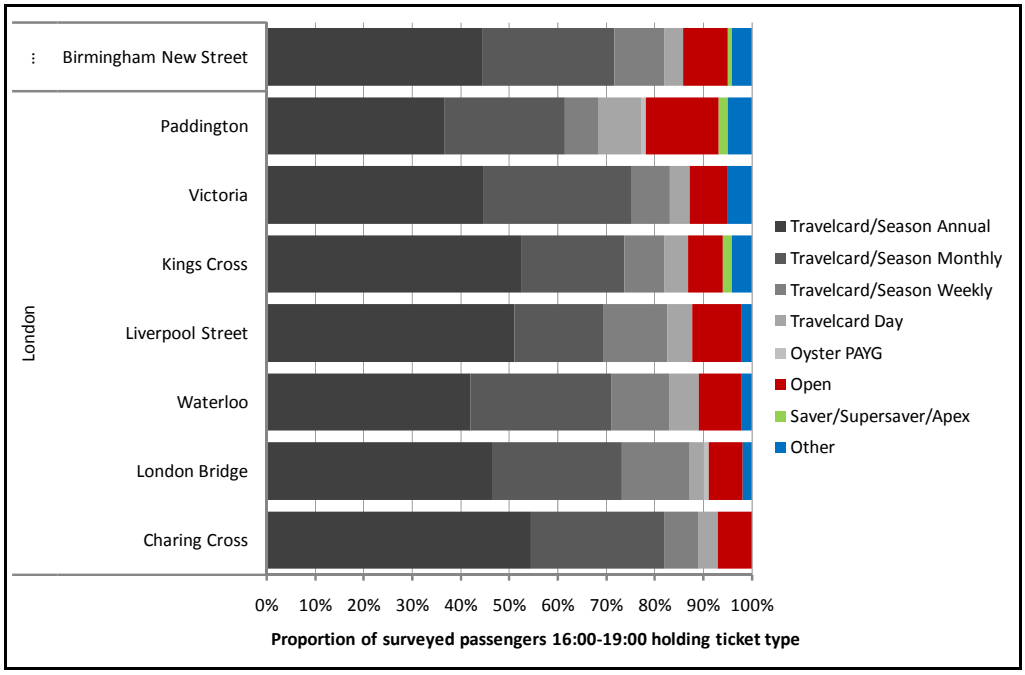
A1.27 The Figure below, based on data in the Faber Maunsell report, shows the extent by which the highest 30-minute AM peak demand would fall if the 90-minute peak demand were evenly distributed. In principle, demand on some services would fall by up to 24%, although on the suburban services demand is already relative flat and the improvement would be only 13%.



A1.28 This highlights one of the key limits to the potential of the proposal: even if short distance peak and off-peak fares diverged so much that the peak suburban travel demand was flat over 90 minutes, this would only secure a 13% reduction in peak suburban flows, unless some short distance passengers changed modes, or did not travel, which has not been investigated.

Mix of ticket types

A1.29 The Figure below summarises Table 4.16 of the report showing the proportions of different ticket types held by passengers in the PM peak 16:00-19:00.



A1.30 The dominant type of ticket at all stations was the season ticket or Travelcard or Oyster "pay as you go" (PAYG). Except at Paddington, where commuter flows are relatively small, over 80% of passengers held Annual, Monthly or Weekly tickets. Conversely, the combined proportion of all other tickets, including what are now Anytime, Off-peak and Advance products, only exceeded 15% at Paddington, where it reached 22%.

A1.31 Most of the tickets for travel within London will now have been replaced by Oyster products, in principle enabling passengers to be moved from season tickets to PAYG, but there are a number of potential disadvantages not examined by the report:

- The effect on working capital if seasons are replaced by PAYG
- The feasibility of peak/shoulder peak differentials of up to 40% or 100% (sic)
- The attraction of off-peak passengers into the shoulder peak
- The constraints on, and of, other fares
- Unintended consequences and avoidance strategies

Saver fares differentiation and deregulation

A1.32 Source document for this Chapter is "Saver Fares: Differentiation and Potential Deregulation" by Faber Maunsell/AECOM for DfT, July 2007.

Key points and conclusions

A1.33 Faber Maunsell carried out a literature review, covering some of the documents described elsewhere in this document, surveys of 1,250 passengers, and stated preference work in which passengers were offered a choice of different tickets at different times. They then developed models of the utility of different ticket types and the option of not travelling:

- Open, comprising fare
- Saver, comprising fare, time displacement and a constant
- Advance, comprising fare, time displacement, a disutility proportional to how far in advance of travel that purchase was required, and a constant
- Not travelling

A1.34 The model appears to assume that a holder of an Open ticket will be able to find a seat on any train, rather than having to book a seat which might also involve a time displacement. As we discuss below, this is probably a reasonable assumption if, as appears to be the case, profit-maximising peak fares are higher than market-clearing fares, with the result that seats are always available on peak trains on which only season tickets are regulated.

A1.35 The model was tested on two notional corridors, of 190 and 270 miles, to examine changes such as:

- A "shoulder Saver" 40-50% above the Saver fare, not clearly defined but presumably applying in the shoulder peak
- Reductions in Saver availability
- Increases in Saver fares
- Reductions in off-peak fares

- Increased availability of Advance tickets

A1.36 The general conclusion was that increases in Saver fares would lead to an increase in operator revenue, but that a combination of shoulder peak fares and reduced off-peak Saver fares could help manage demand in a way that would be revenue-neutral.

A1.37 We now have access to the model and expect to be able to make use of it in Part 2 of this study.

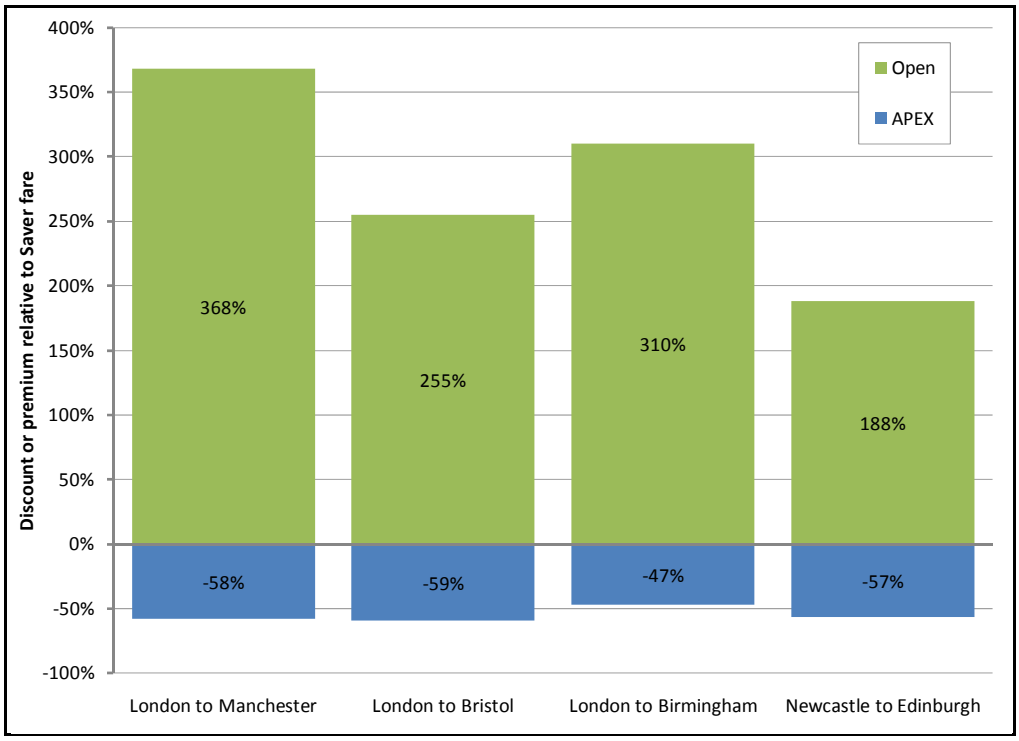
A1.38 The table below summarises a number of key points from the report.

Key issues and findings	**Reference**
Illustration of the levels of return APEX, Saver and Open fares.	1.3.2
Complexities of the existing restrictions on Saver fares.	1.3.3
Single leg pricing has been examined.	1.3.8
General conclusions: Saver fare increases would lead to an increase in revenue after taking into account impacts of revenue from other ticket types. Shoulder peak fares (40-50% above the Saver fare) combined with reductions in Saver fares could be used to manage demand with potential revenue neutrality.	5.6.16

Issues and illustrative findings

Relative levels of APEX, Saver and Open fares

A1.39 The Figure below summarises the levels of APEX (now Advance) and Open return fares relative to the Saver return.

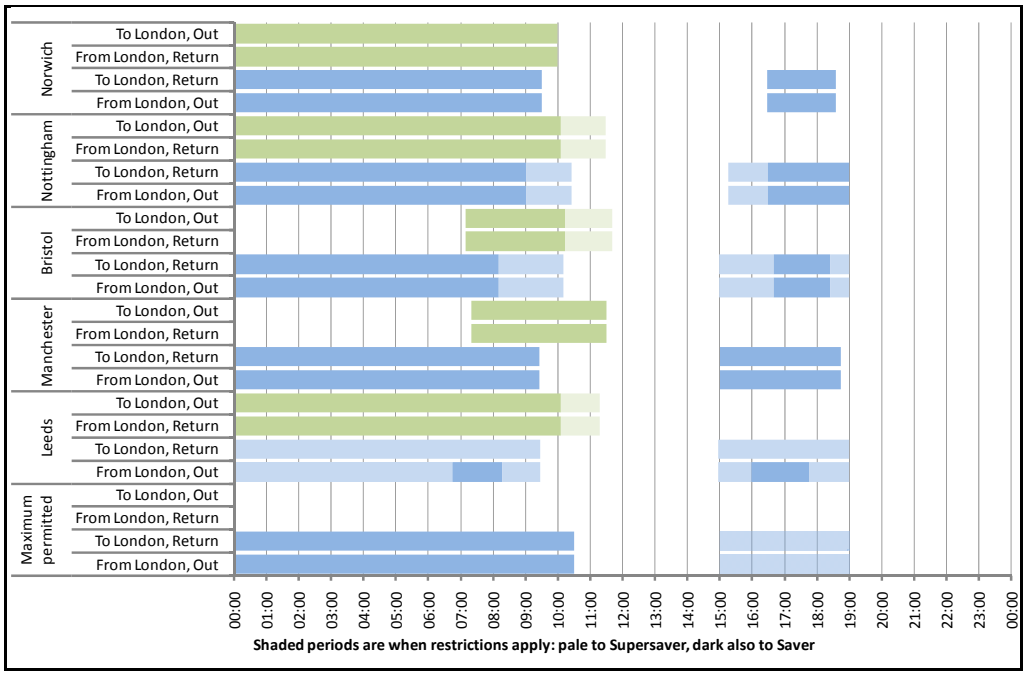


A1.40 On the routes selected, in 2007, the Open return was up to 368% above the Saver fare and the cheapest Advance fare was up to 59% below the Saver fare. The marginal fare for season ticket holders is zero.

A1.41 In contrast, at shorter distances the difference between the highest and lowest PAYG fares in London is relatively small. There is no equivalent of the unregulated open ticket, and the most expensive fare is the peak PAYG fare. Our analysis of TfL's 2011 fares suggests that the maximum discount for off-peak travel is 47%, but the (unweighted) average is around 30%.

Saver restrictions

A1.42 The Figure below updates the analysis of when Savers and Supersavers for a typical station on each major interurban route are accepted at London terminals.



A1.43 For all the examples except Manchester, Savers are available at least from 10:30 to 15:00 and after 19:00. Savers from Manchester to London appear not to be available for arrival before 11:30.

Evidence to the Transport Select Committee

A1.44 Source documents for this Chapter are:

- For the 2006 "How fair are the fares? Train fares and ticketing" Sixth Report of Session 2005-06:
  - "Volume II" comprising oral and written evidence
  - "Government's response to the Committee's Sixth Report of Session 2005-06" comprising the summary report and Government's response
- For the 2009 "Rail fares and franchises" Eighth Report of Session 2008-09:
  - "Report, with formal minutes, oral and written evidence"
  - "Government response to the Committee's Eighth Report of Session 2008-09"

Key points and conclusions

A1.45 The Transport Select Committee documents include a mix of verifiable fact, subjective oral evidence, and the interpretations placed on it by the Select Committee and the Government in its response.

A1.46 The points identified below have been noted to identify issues which may be relevant to the present study.

2006

A1.47 The table below summarises a number of key points from the oral and written evidence.

Key issues and findings	Page
Comparisons of British and European rail fares including the French "kilometric" fare table.	Ev3-Ev20
"Families are not provided with coherent and effective incentives to use rail". "Some companies offer a "carload" fare where four or five people can travel together at a discounted group price."	Ev22 Ev28
Revenue for through journeys are prorated to the operators on the basis of mileage. "In reality the branch line operator actually receives much less than the passenger thinks they have paid for the extra journey on the branch."	Ev28
"People should be given the opportunity, once the compartments are full, to take seats in First Class rather than stand for long and arduous journeys."	Ev31
"There is substantial scope to integrate National Rail and London Underground fares within a unified structure."	Ev53
"Train operators argue that the current positioning of the regulated Saver fare denies them the opportunity of offering a wider range of scaled book-ahead fares."	Ev55
Given ticket gating in the London area (reducing the scope for fraudulent reuse of an unexpired ticket) there is no reason why all Open tickets should not be valid for a month nationally.	Ev55
"An apparently minor change in timetables, without a corresponding amendment to the conditions of use of some tickets, denies passengers the opportunity to travel by trains previously available to them."	Ev56
Manchester to/from London prices per single journey (Table 3).	Ev82
The complexity of the system means that fare anomalies are inevitable.	Ev99
"90% of our (GNER) passengers have access to the website."	Ev103
"70% of "turn up and go" customers benefit from some kind of discounted fare".	Ev113

A1.48 The table summarises a number of key points identified in the summary report.

Key issues and findings: this text is reported verbatim	**Page**
"Fully flexible open fares may need to command a price premium over other less flexible tickets, but the prices now charged by many long-distance operators are absurdly high."	15
"Cheap advance purchase fares are a sensible way to fill up off-peak seats that otherwise would not be sold, but this must never be to the detriment of affordable walk-up fares."	16
To maximise the public benefit of the railways "entails the greatest possible number of passengers travelling at the cheapest possible prices without raising public subsidies to unrealistic levels. This is not synonymous with the maximisation of revenue or profit for private operators."	4
"Train operators must take urgent action to implement a unified fares structure across the entire industry. This should involve no more than a handful of different fares, and names and restrictions should be identical across the network."	6-7
"We want to see a system where passengers can identify easily and quickly how they can travel most cost effectively within a three day period, that is, what departures have the cheapest fare, and what restrictions on these tickets are."	19

2009

A1.49 The table below summarises a number of key points from the oral and written evidence.

Key issues and findings	**Page**
There are a total of 100 million rail fares.	Ev4
National Express Group's websites had a "lowest fare finder" facility.	Ev11
Advance tickets can normally be bought up to the midnight before travel, and there is discussion of moving this to ten minutes before travel. (At least one operator is now trialling reservations ten minutes before travel.)	Ev21
Tabulation of train operators and franchises including end dates.	Ev59

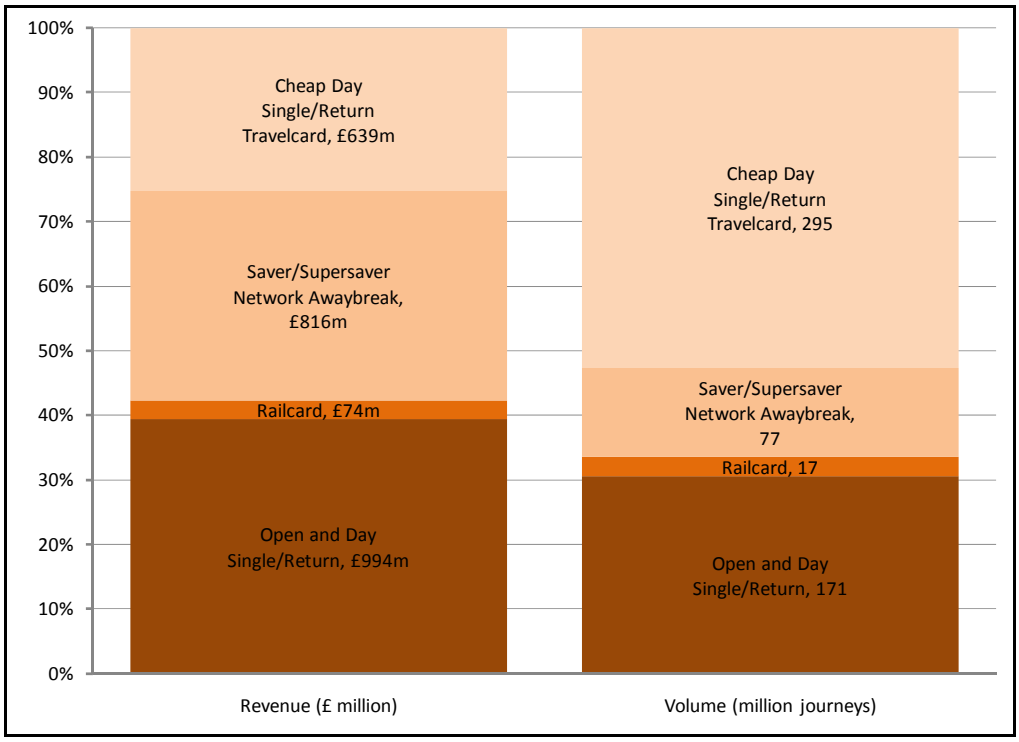
A1.50 We reviewed the summary report and Government response but found no further material information.

Issues and illustrative findings

A1.51 The information collated above is selective but raise a number of issues, which we discuss briefly below.

"Walk-up" purchases

A1.52 The Figure below summarises ATOC's evidence (Ev113) that 70% of walk-up customers by volume obtain a discounted fare. This illustrates the point that only 30% of "walk-up" passengers buy an open or unrestricted ticket.



Kilometric fares and anomalies

A1.53 One issue raised in evidence is that "anomalies" in fares may arise, including that a fare on contiguous flows A and B:

- Is more than fares A and B (Two items cost less separately than together)
- Is less than either fare A or B (Two items cost less than one of them)

A1.54 Evidence was given that such anomalies are inevitable in a complex system. The only simple way in which they can be avoided is to have a completely "kilometric" system in which there is a single fare determined wholly by the shortest distance between two points on the network.

A1.55 In other fields, including foreign exchange and share markets, the introduction of anomalies immediately creates profit opportunities, and industry players take extensive steps to avoid them including software tools which monitor other prices. Analogous software tools could be developed to search for anomalous rail fares and draw them to the attention of the operators.

A1.56 There are, however, normally good reasons for anomalous fares, particularly where an operator offers discounted fares to stimulate demand or fill off-peak capacity. One or more of the operators in A, B or A+B markets might reduce fares, but if a number of unregulated fares set by two or more different operators are inconsistent in a way which creates an anomaly, who is at fault and who should change? We understand that coordination by operators to avoid the creation of anomalies could be seen as anti-competitive and lead to referral to the Competition Commission.

A1.57 The remedy for "anomalies" is not to remove them but to ensure that passengers are always offered the cheapest fare. In the airline industry, systems identifying travel options are audited to check that they do not unduly favour specific airlines

or fares. In principle, systems offering rail fares could be required to carry out specific additional checks for cheaper fares. The most obvious additional check is the price of Advance fares bought separately for the leg of the journey carried by each operator. However it is unlikely that any manageable process specified in advance will always find the cheapest possible means of completing a journey.

A1.58 Even with smartcards, it will probably be impossible to stop split ticketing where a journey requires interchange providing sufficient time to "touch out" one ticket and "touch in" another. This would be necessary at gated rail-Underground/DLR interchanges such as Lewisham, Balham, Wimbledon, West Hampstead, Finsbury Park, Tottenham Hale and Stratford but could also be done to "split ticket" at any point where there was a need to interchange, potentially including Greenwich, East Croydon, Wimbledon, Clapham Junction, potentially enabling commuters to exploit combinations of "cross-boundary" and "in-boundary" tickets.

Family and group travel

A1.59 Discounts exist for family and group travel, in part because it is seen as desirable to encourage groups to switch from road to rail, and in part because such discount have existed in the past, or exist elsewhere. The former argument may need to be treated with some caution, because the marginal costs of an extra car occupant are very low and the marginal costs of an extra rail passenger can be very high.

A1.60 One specific issue in relation to Railcard discounts is that operators are not obliged to offer them on all fares. This could in principle mean that Advance tickets became cheaper than any fare with a Railcard discount, undermining the value of the Railcard. We understand that ATOC has now agreed that Railcards offer a discount of one-third on all non-season Standard tickets, but one option might be to make this a requirement.

The balance of First Class and Standard accommodation and passengers

A1.61 There is a concern that First Class accommodation remains empty and unused while Standard is full to capacity. Airlines normally respond to this problem by "upgrading" passengers to a higher standard of seat at check-in. Rail operators could randomly reserve Standard passengers into First Class seats which were unlikely to be filled, although it should be more profitable to offer and optimally price a discounted First Class product.

The effects of minor timetable changes

A1.62 The 2006 evidence (Ev56) noted that minor timetable changes could result in a large effective change in fare without a corresponding change in the conditions. The 2009 evidence (Ev2) noted that a fare to travel from Carlisle to Birmingham and arrive "before 10:30" had risen from £71 to £124, which could in principle have been the result of one Birmingham arrival being retimed from 10:29 to 10:31.

A1.63 Simplicity in fare conditions, with the beginning and end of validity periods standardised, would inevitably mean that retiming of station stops may result in major changes in the fare on what was perceived as "the same train". Conversely, stability of conditions on slightly retimed trains would require a detailed list of station calls to be treated as exceptions, some of which might be that, despite being just inside an off-peak period, a particular station call was specifically identified as being in the peak.

Fully flexible open fares

A1.64 The Select Committee considers that these fares are "absurdly high". On trains they offer a "walk-up" option for all trains, on aircraft they are still subject to seat availability and compulsory reservation. Holding back capacity for last-minute demand on even the busiest services is expensive for both airlines and rail operators, and the fares are therefore almost inevitably the most expensive. In addition, at times of peak demand, providing capacity for "walk-up" passengers inevitably requires that these fares are above the market clearing price.

A1.65 In practice, and as discussed above, the freedom from regulation at peak times means that most long-distance peak trains still have seats available. The fact that some shoulder peak trains on which Savers are valid depart full and standing, a situation not permitted on aircraft, suggests that either these fares could be higher or fewer seats should be sold at lower fares.

Cheap advance purchase fares

A1.66 Cheap advance purchase fares are available on a number of European railways, and are generally welcomed. However, we understand that in countries where these fares are offered they also inevitably generate a sense of entitlement and a belief that other fares are unreasonable. A common belief is that the lowest fare cannot be "below cost" and hence "If it only costs them €10 to give me a seat, why should they be allowed to charge more?"

Public benefit of the railways versus profit or revenue maximisation

A1.67 The Select Committee's case is that the objective of the railways should not be revenue or profit maximisation, and by implication that operators should be required to price and allocate capacity on some other basis. This would require, as a first step, that the Government defined a social value for each journey, which might not be the current ticket price.

A handful of different fares with identical names and restrictions

A1.68 In extremis, in a two-class railway, it would in principle be possible to have only two fares: First Class and Standard singles, each valid on any permitted or reasonable route, and potentially defined only by distance and with a standard differential between them (on some railways the First Class fare has been fixed at 50% above the Standard fare). However, any changes to existing fares and restrictions would have one or two effects, both with distinct disadvantages:

- Removing cheaper fares, or tightening restrictions, which would generally reduce revenue and passenger numbers and create losers.
- Removing more expensive fares, or loosening restrictions, which would generally reduce revenue but increase passenger numbers and crowding.

"Easy and quick" identification of the options over a three-day period

A1.69 While an admirable goal, with a high frequency of services on a range of routes, there are inevitably a large number of options. Even minor rural routes normally offer several trains a day, with twenty or more options in each direction over a three-day period. For a complex journey such as Portsmouth to Perth, there might be hundreds of options via ECML, WCML and CrossCountry services, some of them involving combinations of tickets with different restrictions.

Institute for Transport Studies, University of Leeds

A1.70 Source document for this Chapter is "Optimal fares regulation for Britain's railways", Gerard Whelan, Richard Batley, Jeremy Shires, Mark Wardman, Institute for Transport Studies, University of Leeds, "accepted March 2007" as published in Transportation Research Part E.

A1.71 The paper presents an econometric demand model, calibrated from stated preference data, of choices between rail ticket types and whether or not to travel. The model included factors such as the disutility of crowding, standing, and changing time of travel to gain access to a lower fare. It was tested on a short distance London commuter flow and a long distance interurban flow for a range of policy scenarios.

A1.72 The paper did not examine the effects of quasi-regulation of some fares by others, basket drift, the increasing difference between fare weights in the basket and the actual proportions in which they are bought, or other strategies which might be applied by operators to achieve greater rises in fares and revenue than was intended by the design of the regulatory regime.

Key points and conclusions

A1.73 The principal conclusions relate to the aggregate revenue and welfare effects of 2%, 5% and 10% increased to the fares basket, and a 2% increase with any individual fare rise being limited to 6%.

Key issues and findings: this text is reported verbatim	**Reference**
"Imposition of a 6% maximum on the increase in any individual fare had the effect of reducing revenue and increasing welfare loss, by preventing the loading of the increase onto the least elastic ticket types and actually reducing some of the more elastic fares."	5
"For this same reason, it is desirable to define the basket as widely as possible. Given a single price cap on a basket of fares and any specific objective of revenue generation, the latter will be attained with lower welfare penalty if the basket is defined widely rather than narrowly."	6
"It is not always the case that it is welfare superior to regulate a basket of goods than single fares. But certainly, in the absence of externalities, it will always be better to regulate a basket of fares than to single out those with less elastic demand."	6
"Finally, it is worth acknowledging that other considerations may however motivate the regulation of peak tickets; such considerations might include equity or implications for road congestion".	6

Issues and illustrative findings

A1.74 The paper concludes that a fares basket should be drawn widely, and that any restriction on the maximum rise in individual fares within it will both reduce revenue and increase welfare loss, because its effect will be to force operators to

transfer fare rises from inelastic to elastic markets. However, it is not possible, from case studies of single flows, either:

- To quantify the effect at the national level.
- To identify by how much an operator would increase specific fares in the absence of such a restriction, or whether it would be acceptable to do so.

A1.75 In summary, the paper demonstrates that the current limit on the maximum rise in any individual fare is inefficient, but cannot quantify either the economic costs or the presentational risks of relaxing or removing it.

Passenger Focus research on European fares

A1.76 Source document for this Chapter is "Comparisons between fares and ticketing in Britain and continental Europe", Steer Davies Gleave for Passenger Focus, February 2009, carried out largely by members of our current study team.

A1.77 The study examined only public data on fares available in the market place for journeys in five different distance bands, with two important limitations:

- It had no access to sales or revenue data or basis on which to estimate average fares or "yields" for the mix of ticket types actually sold for each journey.
- It did not examine cost data or attempt to compare fares revenue with costs.

Key points and conclusions

A1.78 The study's Executive Summary (Page 15) included the principal findings, which are summarised below.

Key point on fares in Great Britain	Reference
Fully flexible day return fares are among the highest in Europe. "Walk-up" fares with some restrictions are more competitively priced.	2.1
London season tickets are more expensive than to other European cities. London commuters benefit from the highest frequency of trains, early first trains and late last trains.	2.2
Open long distance fares are significantly more expensive than elsewhere.	2.3
The variability of fares is highest, for example London to Manchester: Differential of 3.5:1 between "Anytime" and "Off-peak" returns.	2.4
The variability of fares can be even higher if purchased in advance, to Leeds: Differential of 10:1 between dearest Open and cheapest Advance fare. (Differential of 7:1 exists in some fares in Sweden.)	2.5 12.14
Long distance service frequency is the highest in Europe. (London to Birmingham and Manchester has now risen from 2/hour to 3/hour.)	2.6
Long distance services offer earlier arrival times and later departure times.	2.6
Off-peak fares are often comparable or better value than elsewhere. Off-peak fares for advance purchase are among the lowest, especially to London.	2.7

A1.79 The work was based on August 2008 timetables, fares and incomes. Since then:

- The new timetable on the West Coast Main Line (WCML) has reduced journey times and increased frequency to 3 trains per hour between London and Birmingham and London and Manchester, as noted above.
- Changes in exchange rates do not affect the results, but different income growth rates may have changed relative affordability by a few percent.

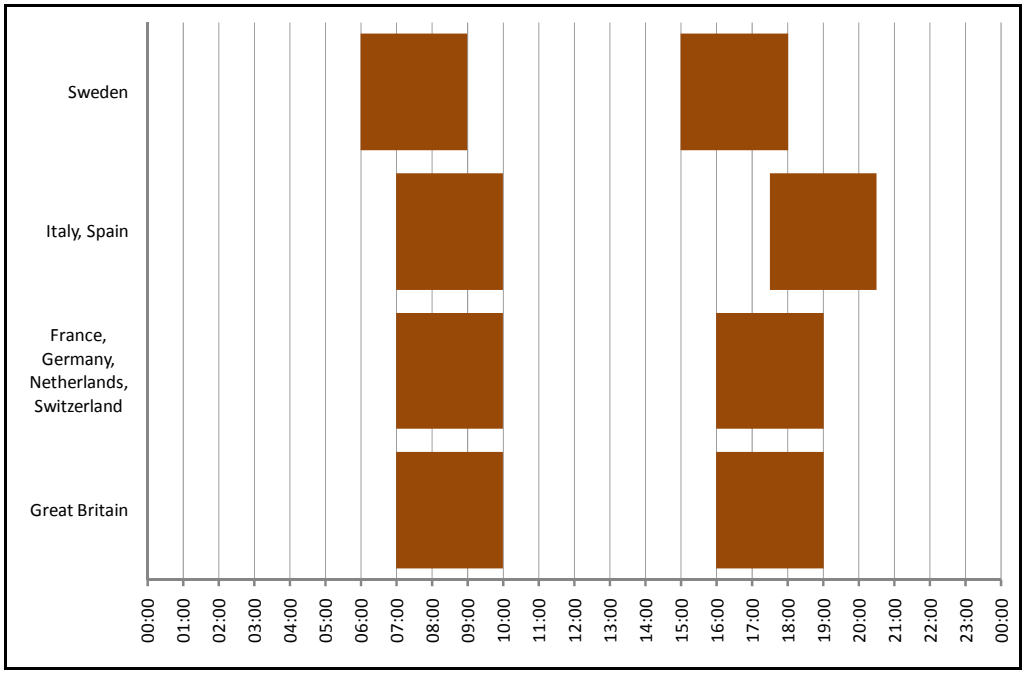
Issues and illustrative findings

A1.80 The study produced a series of detailed comparisons of fares and other journey characteristics for a range of sample journeys in different distance bands. There was no attempt to calculate or compare average fares at a highly aggregate level, or to prepare a systematic comparison of fares types.

A1.81 With the exception of London's Oystercard, the study did not identify or examine any use of smart card technology in relation to any of the journeys studied.

A1.82 The study also noted key differences in geography between Great Britain and other countries. In particular, relative to Great Britain, other countries tend to have large distances between cities and smaller commuter catchment areas. The volume of commuters, and particularly long-distance commuters, into London is much greater than for any other city in Europe.

A1.83 The definition of peak periods differ between countries, as shown below.



A1.84 Great Britain's peak periods of 07:00-10:00 and 16:00-19:00 are shared with France, Germany, the Netherlands and Switzerland. In Italy and Spain, the evening peak period is 90 minutes later. In Sweden, both peak periods are one hour earlier.

Passenger Focus research on regional fares

A1.85 Source document for this Chapter is "Regional commuter fares and ticketing comparisons in Great Britain", Steer Davies Gleave for Passenger Focus, January 2009, carried out largely by members of our current study team.

A1.86 The study examined commuter travel to cities in different regions in three different distance bands. It had no access to ticket sales or revenue data, and hence no basis on which to estimate average fares or "yields" for the mix of ticket types actually sold for each journey.

Key points and conclusions

A1.87 The study's principal findings are summarised below.

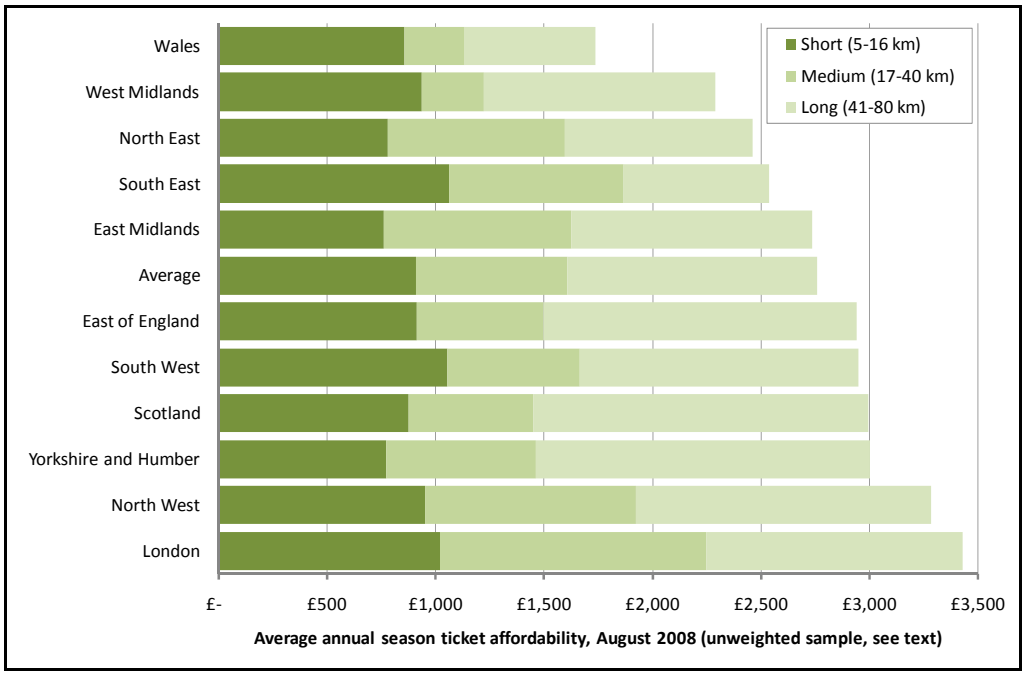
Key point	Reference
London has more frequent services, at all distances, than all other regions.	2.1
Services elsewhere are generally more limited with a later start and earlier end.	2.1
Across the regions, average service speed is less variable than average frequency.	2.2
London has the highest unrestricted commuter fares at all distances. Non-London travel in the South East is cheaper than elsewhere.	2.3
Restricted short and medium distance fares, for arrival between 1000 and 1200, are similar everywhere. Restricted long distance fares to London are more expensive than elsewhere.	2.4
Medium and long distance season tickets to London are the most expensive. Medium and long distance season tickets in Wales are generally cheapest.	2.5

A1.88 The work was based on August 2008 timetables and fares.

Issues and illustrative findings

A1.89 The study identified, prima facie, evidence of regional variations in the affordability of season tickets, which are illustrated below. This suggests that season ticket prices are highest for commuting to London, but not elsewhere in the South East, and lowest for commuting in Wales.

A1.90 However, it should be noted that the estimates are based on the average price for five journeys, standardised for journey distance and adjusted to disposable income relative to London. They cannot be based on identical journeys and hence cannot exactly reflect either the relative price or relative affordability of identical journeys.



A1.91 Note also that fares sustainable in the market place will depend on other transport interventions including:

- Road levels of service including speed and parking charges
- Supported bus services and fares

A1.92 With current road and bus levels of service, it may not be possible to raise rail fares in (say) Wales to London levels without massive transfer from rail to those modes.

International comparisons for Transport Scotland

A1.93 Source document for this Chapter is "International comparisons of rail networks and policy lessons for Scotland", Steer Davies Gleave for Transport Scotland, published in July 2007, carried out partly by members of our current study team.

Key points and conclusions

A1.94 This review was confined to the "Indicative statistics on funding" presented in Figure 5.2 of the published report.

Key points, based principally on 2005-2006 data for a limited sample of European networks	**Reference**
Railway costs are recovered from both freight and passenger customers.	5.2
The balance of costs to be recovered from passengers depends on the extent and profitability of freight operations.	5.2
Of the (few) European networks studied, the proportion of total railway costs recovered from freight and passenger customers varied from 30% to 57%.	5.2
Of the (few) European networks studied, the proportion of costs allocated to passenger services recovered from passengers varied from 43% to 71%.	5.2

Issues and illustrative findings

A1.95 The study attempted, inter alia, to examine the proportion of costs recovered from passengers in Scotland and a number of comparators. In practice, this raised a number of issues:

- Railways are funded through various routes, not all of which are transparent, including deficits and borrowing, via infrastructure managers, via regional and local government and via support to passenger and freight train operators. In some countries, no individual body accounts for all this data, and so identifying total cash payments to a railway can be complex or may not be possible from public data.
- Railway infrastructure costs are recovered from both freight and passenger customers, and in varying proportions. In some networks, freight revenues cover all costs, and passengers may be allocated none, or very little, of them. National definitions of passenger operating costs may exclude infrastructure costs or include a proportion of them allocated on some basis.
- Railway capital expenditure may be episodic or "lumpy", and may be either expensed in the year it is incurred or, as in Great Britain, paid for in the longer term through access charges and lease payments. Financial results for a single year may not reflect the long term balance of costs and revenues.
- In Great Britain, support to individual franchises often varies considerably over time according to the "subsidy profile" bid by the franchisee.

A1.96 The Figure below restates the analysis for the European railways examined in the study.

A1.97 At first sight, and as stated above, the chart shows that, in 2005-2006:

- The proportion of total railway costs recovered from passenger and freight customers varied from 30% in Scotland to 57% in Sweden
- The proportion of costs identified to passenger operations recovered from passengers varied from 43% in Scotland to 71% in Ireland
- Subsidy per passenger kilometre varied from 2 pence in Sweden to 17 pence in Northern Ireland

A1.98 However, consolidated rail industry data including all funding flows was only available in Sweden, and careful interpretation of other data are needed:

- Calculations for Scotland were based on the first few months' revenue, support and track access charges of the then new franchisee, First ScotRail, and exclude other franchises, freight operations, and differences between access charges and Network Rail costs.
- Calculations for Denmark were limited to the principal operator, DSB, for which accounts were available, and required an estimate of its unpublished access charges and infrastructure costs.
- Calculations for Ireland did not have access to freight revenues.

A1.99 In summary, comparison of levels of cost-recovery and passenger support between different railways are difficult, particularly where no single body is responsible for funding both infrastructure and operations.

National Rail Trends: fare levels and mix

A1.100 Source document for this Chapter is "National Rail Trends 2009-2010 yearbook", published by ORR on 29 July 2010, and some previous yearbooks.

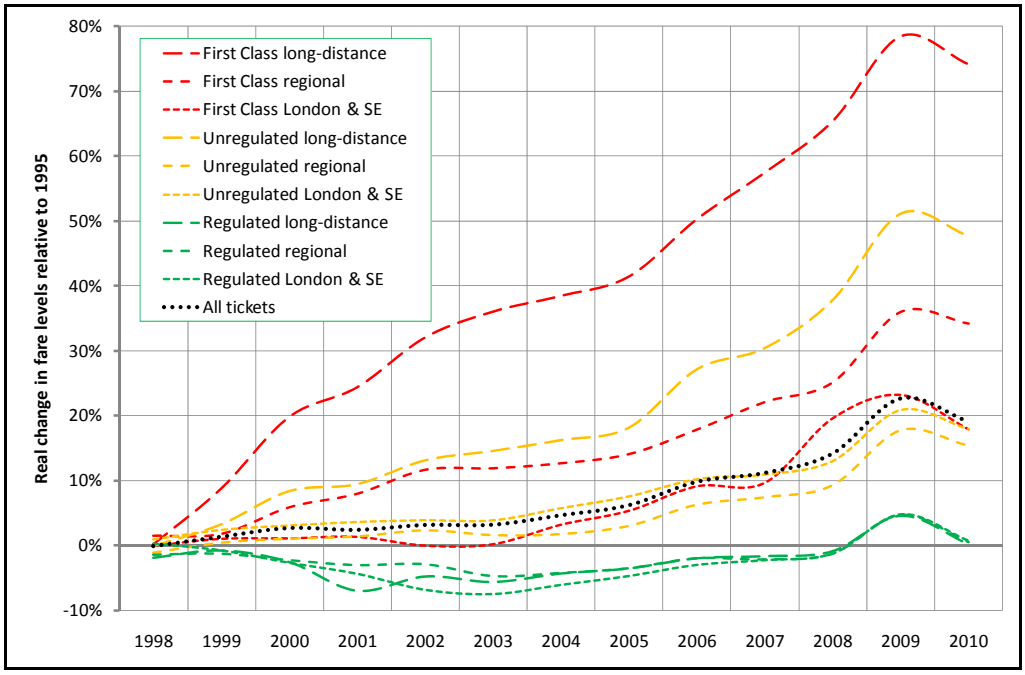
Key points and conclusions

A1.101 This review confines itself to Table 5.1, an index of average change in rail fares 1998-2010. Average fares are expressed in nominal terms but RPI figures are also provided which allow real fares rises to be identified.

Key points, all relating to real fares 1995 to January 2010	Reference
Average fares across all ticket types have risen by 19.1%, equivalent to 1.2% per annum.	5.1
Average regulated fares have not changed materially since 1995, with a decline followed by a subsequent rise under RPI-based regulation.	5.1
Average unregulated Standard fares have risen by between 15.3% on regional services, equivalent to 1% per annum, and 47.7% on long-distance services, equivalent to 2.6% per annum.	5.1
Average unregulated First Class fares have risen by between 18% on regional services, equivalent to 1.1% per annum, and 74.1% on long-distance services, equivalent to 3.8% per annum.	5.1
Only 35% of revenue, and only 22% of long-distance revenue, is derived from regulated fares, and this proportion is declining, particularly on long-distance services.	5.1

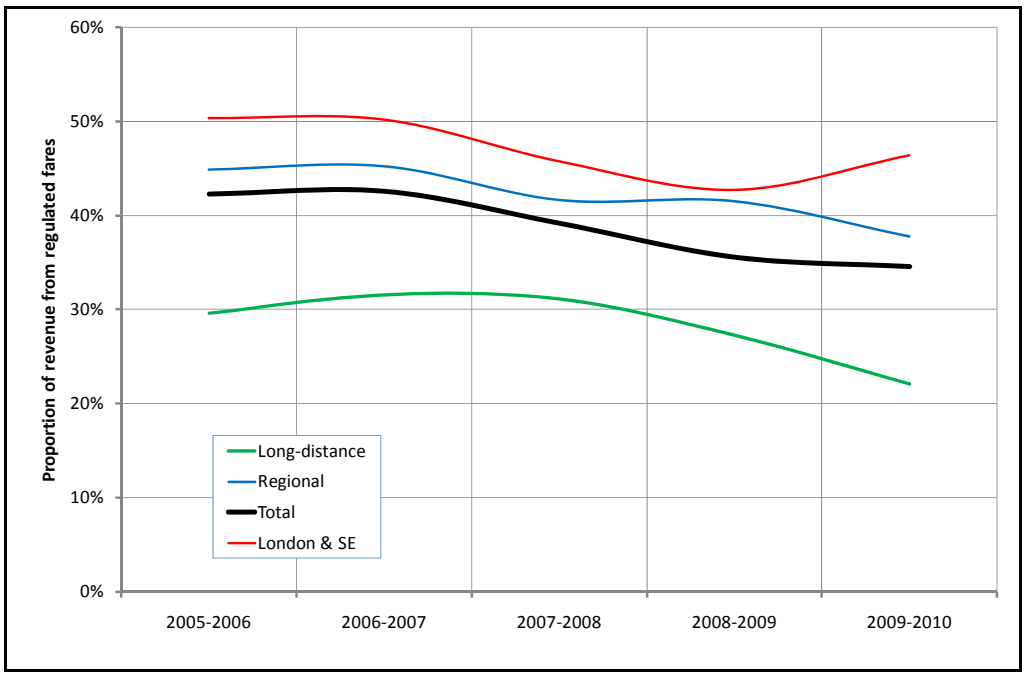
Issues and illustrative findings

A1.102 The two charts below illustrate these points.



A1.103 The Figure above shows in greater detail the trends in average real regulated, unregulated Standard and unregulated First Class fares for each market sector. The greatest average rises have been in unregulated First Class fares, with lesser

average rises in unregulated Standard fares. Average regulated fares in January 2010 are almost unchanged from the levels in 1995. The average price of all tickets has rise by 19.1%, equivalent to 1.2% per annum.



A1.104 The Figure above shows the proportion of revenue derived from regulated fares has generally been declining in the regional and long-distance sectors, presumably as increasing numbers of passenger buy unregulated Advance tickets. By 2009-2010 the proportion of long-distance revenue derived from regulated fares had fallen to only 22% of revenue. On current trends, directly-regulated fares are gradually becoming less relevant.

A1.105 In the London & SE sector, the apparent reversal of the downward trend may be related to the introduction of Oyster PAYG, which resulted in some fares formerly allocated to operators through the Travelcard process being captured directly from the card.

TfL fares 2011

A1.106 Source document for this Chapter is "Fares 2011" published by TfL.

Key points and conclusions

A1.107 All the key points and conclusions have been incorporated into the main body of this report.

APPENDIX

B

REVIEW OF CURRENT FARES AND REGULATION

B1 REVIEW OF CURRENT FARES AND REGULATION

Introduction

B1.1 The aim of this study is to identify and quantify options for using fares to increase revenue, improve network utilisation, correct anomalies, and reduce distortions while as far as possible maintaining fairness.

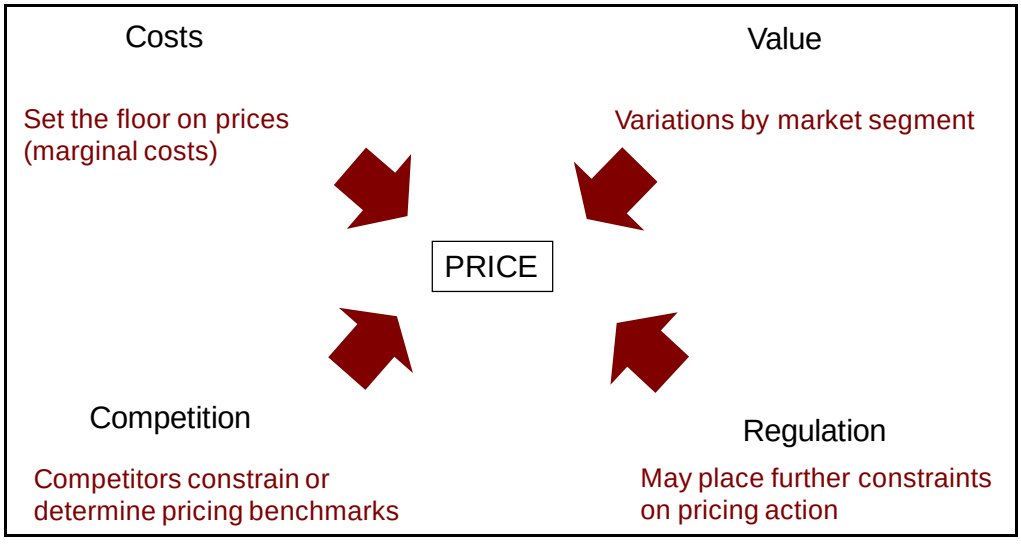
B1.2 The workstream described in this Appendix is an essential first step in understanding and recording the current position, setting the scene for the remainder of the study. We describe the various elements of the current fare structure and regulatory system and their historic development. In doing so we identify issues and stakeholder impacts for consideration in later workstreams.

B1.3 In this Appendix we examine the following issues:

- Methods of market segmentation, demand management, fares simplification and distribution - including the impact of new technologies (e.g. e-ticketing, m-ticketing) – and how these methods are deployed in different parts of the rail network, reflecting variations in markets served, competitors and costs.
- The methods and rationale for regulating peak and off-peak fares, how effectively these meet the objectives set out in the 2003 SRA Fares Review, the continuing relevance of these objectives and any unintended consequences.
- The role of the Ticketing and Settlement Agreement (TSA), in particular in relation to fares setting rules (rights and obligations of the lead and secondary operators), and the structures offered by open access operators.

Setting fares

B1.4 The factors that need to be considered when setting fares are summarised in the following diagram.



B1.5 In the context of rail travel, short-run marginal costs are often little more than the direct costs of sale or commission. However, in the long run additional costs may be escapable if demand falls or is more evenly spread (avoiding peak resources), so long run marginal costs are higher. The position is further complicated by the existence of crowding which reduces demand and revenue, some of which will be

recovered if high peak demand is reduced, whereas the reverse will occur at shoulder peak times spread into. There is also the issue of cost recovery (plus profit), though the need for this is reduced by subsidy, bringing the taxpayer into the equation.

B1.6 Variations in value and elasticities by market segment are a key consideration in setting prices, and various segmentation techniques - by class, life stage (Railcards), time of travel and/or booking - are used to maximise revenue, subject to other constraints and the practical ability to communicate and distribute differential product offers.

B1.7 Competition and regulation place constraints on pricing action, in one case through competitive discipline (on-rail, intermodal and alternative activities, the mix varying by route), and in the other through regulatory rules designed to protect vulnerable groups, reflect externalities, or achieve other policy objectives.

B1.8 We also note that the fare (price and conditions) is only one element of the marketing mix and needs to be considered alongside the product offer (the timetable and the journey experience), its communication and promotion, and the channels through which it can be purchased. It is from these factors that the benefits of rail travel derive, and these will be valued differently by individuals with differing needs and budgets. This is implicit in much of what follows, particularly in the discussion of market segmentation and competition.

B1.9 The following sections trace the historical development of the fares structure and fares regulation, and describe the current position.

Fares structure development

Market pricing

B1.10 For many years rail fares in Britain were based on mileage and this is still the case in many countries today. The Regulation of Railways Act 1844 required all train operators to run at least one "Parliamentary Train" daily providing travel in third class (minimum standards applied) at no more than one penny per mile. However there were other fares that were set at a market rate. In addition, many categories of passenger were given discounts.

B1.11 With the growth of road competition rail needed to be more flexible in its approach to pricing and in 1968 British Railways moved to market pricing. This involved introduction of a new range of fares (described below), and a move away from a strict relationship between fares and distance.

B1.12 Fares were generally increased in line with inflation, and higher fare increases were targeted on routes where investment had been made to improve services, such as introduction of High Speed Trains on the Western Region and East Coast Main Line (in the 1970s). Higher increases were also applied where it was judged that they could be sustained, referred to as "charging what the market will bear".

B1.13 Where possible, routed fares were removed and replaced by a fare by "any reasonable route", recognising that the market is for travel between two points and the passenger cares about the level of service provided between the origin and destination stations but not, usually, the bits of track they pass over on the way.

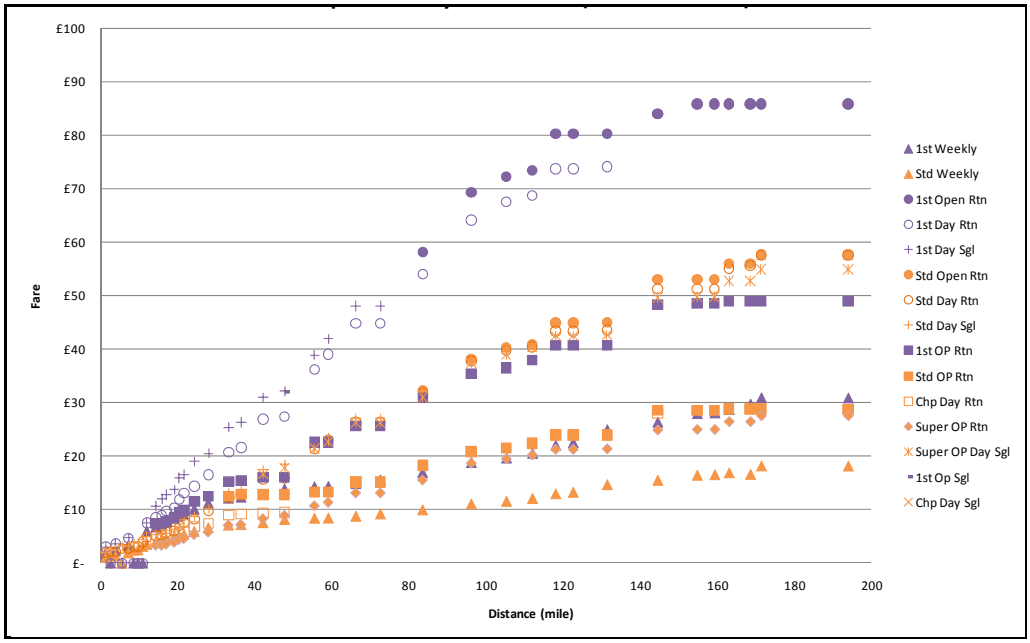
Since privatisation "any reasonable route" has been replaced by "any permitted route" as defined in the Routing Guide.

B1.14 It was not possible to remove all routed fares without creating anomalies or constraining fares to all points on the longer route to the fare by the shorter route. Anomalies can also arise because of the different rates per mile applied to different origin to destination flows as a result of market pricing. They can also result from a mismatch of off-peak ticket restrictions on different flows.

B1.15 As an example of the first category, where a potential anomaly is avoided by use of routing, most passengers from London to Sheffield would travel by East Midlands Trains and if travelling on a walk-up ticket would be sold a routed fare via Chesterfield (Standard Open Return £165.50, Off-Peak Return £84, Super Off-Peak Return £60 at December 2010). This routing is necessary because otherwise the London to Sheffield fares would undercut the London to Doncaster fares (Standard Open Return £185, Off-Peak Return £124.10, Super Off-Peak Return £71.50 at December 2010), and travel from London to Sheffield by Doncaster is recognised as a Permitted Route. A passenger wishing to travel via the East Coast mainline to Sheffield would need a ticket by Any Permitted Route, for which fares are set at the Doncaster level.

B1.16 The other two cases are examples of "split ticketing", whereby it is possible to buy two tickets, A to B, and B to C, at a cheaper price than A to C. This is allowed under the Conditions of Carriage provided the passenger travels in a train that stops at B, but the passenger does not need to get off.

B1.17 This illustrates the interconnectedness of the prices set for different flows and means that pricing compromises sometimes have to be made or anomalies tolerated. It also means that there is still a strong correlation between rail fares and distance on many routes, at least within a single ticket type and possibly with some degree of taper, i.e. a lower rate per mile for longer distances. The Figure below illustrates this for the South West Trains route to Exeter.



Source: South West Trains fares, 2010, reanalysed by Steer Davies Gleave

Pricing by market segment

B1.18 Rail's key strengths are in moving large volumes of people to, from and within congested areas, and in offering fast journey times, and usable time (compared to driving) on long distance routes, particularly high-speed routes. This influences the journey purpose mix on different kinds of flows:

- Flows from the journey to work area around a major conurbation to its central area tend to be dominated by commuter travel in the peak, with most leisure travel in the off-peak period.
- Peak volumes on interurban flows are usually generated by leisure travellers, but significant revenues also accrue from business travellers and increasing longer distance commuting.
- There are also rail flows which are neither commuter flows nor interurban flows. These are typically local in nature and may be served by the commuting or interurban services described above, or they may be rural branch lines. These are often leisure dominated, but may sometimes serve local niche markets, such as school trips.

B1.19 Generally business and commuter trips tend to be price-inelastic – the former due to high values of time and the latter due to a lack of feasible alternatives. Leisure trips tend to be relatively price-elastic. Elasticities in all these markets are influenced by the level of competition from car, coach, and air, and other rail operators.

Class of travel

B1.20 The earliest form of market segmentation on the railway was by class, originally with three classes, reflecting different social classes and ability to pay. From the 1870s onwards, Second Class was gradually abolished and First Class and Third Class were retained, the latter because of the provisions of the Railway Regulation Act 1844 which required a Third Class service to be offered. In June 1956, Third Class was renamed Second Class, which in turn was renamed Standard in the 1980s.

B1.21 While First Class accommodation usually provides greater personal space and sometimes at-seat service, the motivation for First Class travel is often the desire to be with the traveller's perceived peer group.

B1.22 Under British Rail Intercity, the target market for First Class travel was very much the higher status end of the business market, with concerns about revenue and brand dilution if made available at a discount to the leisure market (though a Leisure First advance purchase product was introduced in 1994). One problem with this is that business travel tends to be highly peaked, particularly for the outward AM journey, resulting in poor capacity utilisation. Since privatisation, the long-distance operators have developed yield managed advance purchase First Class fares to open up spare capacity to the leisure market, both to generate revenue and to relieve crowding in standard accommodation.

B1.23 First Class is not available for many local journeys, and this is usually taken into account in setting fares where First Class is only available for part of the journey.

B1.24 First Class fares are unregulated and there is no suggestion that they should be regulated. However, they do interact with Standard fares in ensuring optimum capacity utilisation, so that upgrading passengers to First Class at (volume) peak times not only raises additional revenue but also releases capacity for others in Standard.

Group travel

B1.25 Although ordinary fares were mileage-based until 1968, special rates were offered for group travel from the early days of railways. These would sometimes involve very large volumes of passengers, e.g. a factory shut-down while workers enjoyed a day excursion. Special rates for groups of nine or more are still offered by operators but, given that rolling stock fleets are tailored very closely to service requirements, groups tend to be limited to spare capacity on scheduled services. For smaller groups, see under Railcards below.

Season tickets

B1.26 Season tickets are a long-standing element of the fare structure and have changed little over the years except in PTE areas and the London area where prices are now defined on a zonal basis, and where multimodal versions are available. For the London commuter market, both in-boundary and out-boundary Travelcards are available, the latter available at stations outside London and including travel to and from the Travelcard boundary.

B1.27 While season tickets do target a particular market segment, the main reason for their availability is convenience for the commuter – avoiding purchasing daily tickets – and reduced costs of sale and cash up front for the operator. From the operator's perspective they also reduce the risk of ticketless travel. This risk is one reason why carnets have not taken off in Britain to date (though there are exceptions such as ScotRail's Flexi-pass), even though there is a clear market among part-time workers.

B1.28 Season tickets in their current form also fail to provide any incentive to avoid travel in the peak or high peak.

B1.29 Longer period season ticket prices are usually set as a standard multiple of the weekly ticket price, ranging from 3.84 for a monthly to 40 for an annual. This allows for non-commuting days such as holidays but still gives a heavy discount against the daily ticket. Operators have flexibility, which some have used, to amend this multiplier.

One day validity

B1.30 As another protection against ticketless travel, all ordinary (non-season) fares for short distance journeys are valid only for a day. Originally, under BR, this covered an area of up to 35 miles from central London, but now extends much further (75 miles on the Waterloo to Exeter route) and similar distances for other local flows. There are some exceptions where there is a strong demand for stay away return trips, e.g. the Anytime Return from Gatwick Airport to London is valid for a month, whereas from Three Bridges it is only valid for the day.

Time-away fares

B1.31 When BR introduced market pricing, it also introduced a range of tickets for intercity trips differentiated by time spent away, targeted on particular kinds of journey, as follows:

- Cheap Day Return - this was generally discounted about half the normal return price and targeted on pleasure trips - travel to London was not allowed in the morning peak, but from-London and non-London flows were unrestricted.
- Weekend Return – this was not quite as discounted as the Cheap Day Return and allowed travel Friday, Saturday or Sunday with return on a Saturday, Sunday or Monday - clearly targeted on the short break and visiting friends and relatives markets.
- Monthly Return - this was the main holiday fare, and was less discounted than the Weekend Return.
- Standard Singles and Returns - the undiscounted “rack rate”, with the return price at double the single, valid for three months.

B1.32 Only the Cheap Day Return was available for short distance journeys, maintaining a simple peak/off-peak structure which was easily understood and remains today the standard structure for local trips, with the addition of zoning and multimodality in conurbations. The full structure available on other flows was less readily accepted - passengers were puzzled when asked when they were coming back – and was criticised for being complex. The Cheap Day Return and Weekend Return were successful in generating additional demand, but the latter often exacerbating the Friday and Sunday peak leisure demand periods.

Railcards and small group fares

B1.33 In 1973 BR introduced the Student Railcard. This was later extended to all young people on an age criterion. The logic behind the product is that students generally make leisure not business trips, have the time and desire to travel, but may be budget-constrained. The card price offsets some of the revenue reduction from abstracted trips.

B1.34 Subsequently railcards have been introduced for Seniors (who mainly make leisure trips and have time to travel), Friends and Family (trips with children), Disabled Persons, Forces personnel, and the Network Card for off-peak travel in the former Network SouthEast area. The Friends and Family Railcard also recognises competition from car, where costs per head decline with group size, and several operators also offer a Groupsave product offering discounts to adult groups of three or four.

Time-restricted fares

B1.35 In October 1980, coach deregulation took effect and a number of new services, with competitive pricing, started to erode rail’s market share. British Rail responded with Saver tickets offering a highly discounted return fare on selected trains where spare capacity was available, initially from the North West to London, then on a range of other intercity flows to and from London. However, it was not until 1985, in a "fares restructuring" exercise, that Savers were introduced to all

long distance flows[5], with the withdrawal of long distance Cheap Day Returns and all Weekend Returns and Monthly Returns.

B1.36 The introduction of Savers represents a move away from time-away as a segmentation mechanism to time of travel, with trains with a high level of business travel, and therefore dilution risk, barred to Savers irrespective of loadings. Savers were also introduced at two price levels, the higher price applying if either direction of the journey was made on a Friday, summer Saturday, or certain days around bank holidays – leisure peak times. These later became Savers and SuperSavers.

B1.37 From the beginning, Saver restrictions were often defined as a list of permitted (or restricted) train services, rather than simple time bands (e.g. "after 0930") as were used for Cheap Day Returns in the short distance structure. The large differential between Savers and full fare tickets also meant that the first Saver train was heavily loaded, often overloaded. This also applied to certain afternoon trains out of London, particularly on Fridays. In an attempt to resolve this "spurious peak" problem, some fares managers further fine-tuned restrictions. This created a challenge, which continues to this day, to communicate to passengers which trains they could use with their Saver ticket.

B1.38 InterCity tried to address this communication challenge by using colour-coded literature, an example of which is shown below. The concept researched well, but post-implementation research showed only 7% of customers using the leaflets, which were expensive to produce. The lesson learned was that passengers generally had no interest in understanding the fares structure, they just wanted to know the applicable price for their journey, so making this easily accessible in the journey planning process was key.

MON	TUES	WED	THURS	FRI	SAT	SUN
0505	0505	0505	0505	0505	0505	—
0600	0600	0600	0600	0600	0600	—
0630	0630	0630	0630	0630	—	—
0639	0639	0639	0639	0639	—	—
0700	0700	0700	0700	0700	0727	0734
0756	0756	0756	0756	0756	—	—
0856	0856	0856	0856	0856	0830	0835
1003	1003	1003	1003	1003	0932	0934
1058	1058	1058	1058	1058	1030	—
1200	1200	1200	1200	1200	1200	1134
1306	1306	1306	1306	1306	1330	1333
1357	1357	1357	1357	1357	—	1433
1500	1500	1500	1500	1500	1500	—
1554	1554	1554	1554	1554	—	1601
1654	1654	1654	1654	1654	1630	1700
1800	1800	1800	1800	1800	1800	1754
1930	1930	1930	1930	1930	1930	1930
2130	2130	2130	2130	2130	2130	2130

[5] The guideline when Savers were introduced was that they would be available for flows of over 75 miles outside the L&SE (later Network SouthEast) area, but they have subsequently been introduced on shorter flows. Network SouthEast did not embrace Savers but introduced a 5 day off-peak return called a Network Awaybreak – post-privatisation replaced by Savers. The usual assumption is now that Cheap Day Returns give way to Savers at around 50 miles.

B1.39 Unlike the time away structure, restrictions also applied to trips from London, recognising that the same opportunities for segmentation between business and leisure applied here as well as on flows to London. However, non-London flows were seen as dominated by leisure traffic, and Saver restrictions have only been applied by some operators to these flows in the post-privatisation period.

B1.40 There were some significant variations in the original implementation of Savers by route, which can be seen most clearly by comparing West Coast and East Coast. The original Saver fares introduced from the North West had been highly discounted and West Coast continued this policy, arguing that the marginal cost of additional patronage on their electrified railway was very low. East Coast at this time was operating fixed formation diesel high speed trains, and discounted less. Their Savers required advance booking against a limited quota of seats available on each service. The pre-booking requirement for Savers was removed in the 1985 restructuring, but the price differential between the routes remains.

Advance purchase fares

B1.41 In the late 1980s BR Intercity began to experiment with advance purchase fares, initially selectively and then on a more widespread basis as part of its revenue management strategy, using airline style yield management techniques. This involves setting up a number of price points and controlling availability of each on each train, so allowing more control than the simple on/off restrictions applying to Savers. In addition to using availability by train to segment the market and manage demand, the booking horizon can be used as an additional segmentation device with price-sensitive customers being prepared to book days or weeks in advance.

B1.42 InterCity's strategy involved retention of walk-up fares as many customers wish to retain flexibility over their travel time. However, from the operator perspective, that flexibility makes the final demand for a train service less predictable (compared to compulsory reservation) and so potentially increases costs through either crowding or additional rolling stock. It was argued that since flexibility was valued, but had associated costs, walk-up fares should be set at a premium over advance purchase fares. The advance purchase fares added to the structure were as follows:

- Advance Return: set at the same price as the Saver but available on some shoulder peak trains barred to Savers - the walk up fare on these trains would be the Standard Open Return.
- SuperAdvance Return: set at the same price as the SuperSaver but available on some trains barred to SuperSavers - the walk up fare on these trains would be the Saver.
- Apex Return: set below the SuperSaver and available on off-peak trains - the walk up fare on these trains would be the SuperSaver.
- SuperApex Return: set below the Apex Return and available on deep off-peak trains - the walk up fare on these trains would be the SuperSaver.

B1.43 Although this significantly expanded the range of ticket types available, the idea was that the complexity would be hidden in the reservation system. Prospective passengers would be quoted a price for travel on a specific train, rather than having to navigate sets of restrictions (see paragraph B1.38 above). This is the

same approach as used in the airline industry, though it has only been achieved in the rail industry in recent years, and is still not as simple as practised by low-cost operators such as Ryanair.

B1.44 Since privatisation, long distance operators have developed the application of yield management to rail and invested in yield management systems personnel and training. One key difference from the InterCity approach is that all advance purchase fares are on a single leg basis - there are no returns as in the InterCity structure. This makes sense from a systems perspective as the outward and return legs can be processed independently. This is also easier for the consumer to manage as they can determine their best price for each leg, trading off price against other factors, rather than having to deal with both legs simultaneously, taking account of their joint effect on the return fare.

B1.45 Another difference is that operators generally have a greater number of advance purchase price points than did the InterCity structure. Typically for a long distance flow there might be eight Standard price points, of which three might be between the Saver (now Off-Peak) and the full fare, and five below the Saver[6]. The names given to these price points are only meaningful internally and not intended for public communication. At any one time of booking there is only one relevant advance purchase fare available in each class between specific origin and destination stations on a specific train.

Fares simplification

B1.46 In addition to the fares described above, promotional fares have been available from time to time, and following privatisation there was divergence between operators on ticket naming and conditions. This made the fare structure seem more complicated than it actually was. ATOC worked with operators, Passenger Focus and DfT to standardise nomenclature and conditions, and in 2008 announced a standard structure with the following components:

- Anytime, replacing the previous Open tickets
- Off-Peak
- Super Off-Peak (optional)
- Advance, covering all advance-purchase fares

B1.47 This is essentially a long-distance structure. The short distance equivalent supplements each name with “Day”, e.g. a Cheap Day Return becomes a Off-Peak Day Return, and in general does not have Advance fares.

Technology

B1.48 The range of advance purchase fares is well-suited to journey planning and booking via the internet, allowing prospective travellers to see the choices available to them at very low marginal cost of sale. While we would expect some equipment costs to vary with sales volumes, the main direct costs are in fulfilment, particularly if tickets are posted out. Tickets can be conveniently collected at

[6] The comparison is between an advance purchase single and half a Saver return. "Between" and "below” are not therefore precise terms as the part of the Saver return attributable to each leg need not be 50%. However, the concept is helpful in terms of thinking of a ranking by yield, with the more expensive advance purchase fares being available within the Saver barred period and the others outside.

vending machines at major stations, and there are examples of other fulfilment methods such as printing a barcode, or sending it to a mobile phone.

B1.49 Smartcards provide a means of storing either a ticketing product such as a Travelcard, or credit which can be used against pay-as-you-go (PAYG) fares. This removes transactions from the ticket office and thereby reduce costs of sale. It also makes feasible a more granular range of prices, to smooth demand in peak periods by reading the journey details, and either automatically debiting the card against stored value or recording details for billing against a call-off contract; the latter is likely to be the case for journeys with higher fares than the urban systems so far implemented.

B1.50 Smartcards are likely to appeal to more regular travellers, with infrequent travellers more likely to use the methods described in the previous paragraph. However, it seems likely that the two approaches will converge through apps available for smart phones allowing them to function as a smartcard, e.g. use of Near Field Communication (NFC) to allow operation of ticket gates.

B1.51 Beyond this it is possible to envisage a radical increase in the convenience of public transport, with journey planning, booking and fulfilment all integrated into a product, some of which would occur automatically as the journey is made, subject to the protocols set by the user. This approach is particularly suited to walk-up travellers who require flexibility and wish to book at the last minute, particularly on routes where the rail service is frequent, though the same media could be used for advance purchase fares.

B1.52 One constraining factor may be the ability of ticket gates to perform PAYG fare calculations sufficiently quickly, which becomes more difficult as the geographical area covered expands. The task is simplified in urban areas by use of zonal fares. In any case this may be a temporary constraint with a technological solution.

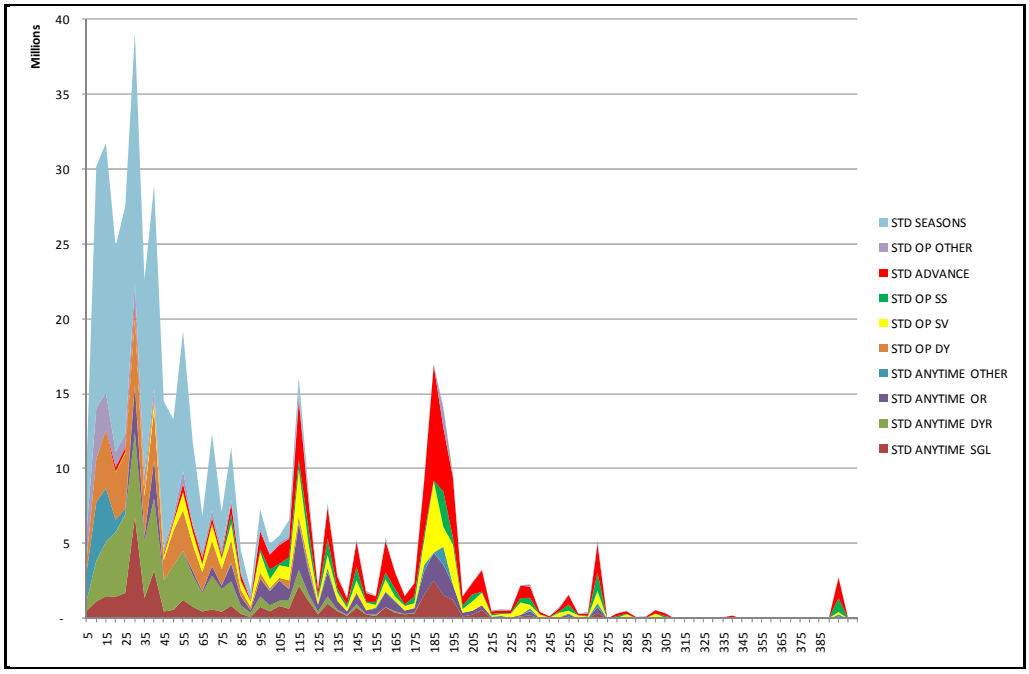
B1.53 However, PAYG may not be suitable for all journeys, even regular journeys where the fare per journey exceeds a few pounds. Firstly, there are transaction limits imposed by the Financial Services Act. Secondly, passengers are likely to want to know how much they are going to pay before they get on the train. Rather than stored value the smartcard may hold a pre-paid product (such as a season ticket or Travelcard) or details of the passenger's account for billing. Then the gates need only check the validity of the card at the point of interception, and no fares calculation is needed. It is also possible to envisage a hybrid arrangement where an off-peak season is held on the card and supplements for occasional peak travel are debited against stored credit.

Summary of current fares structure

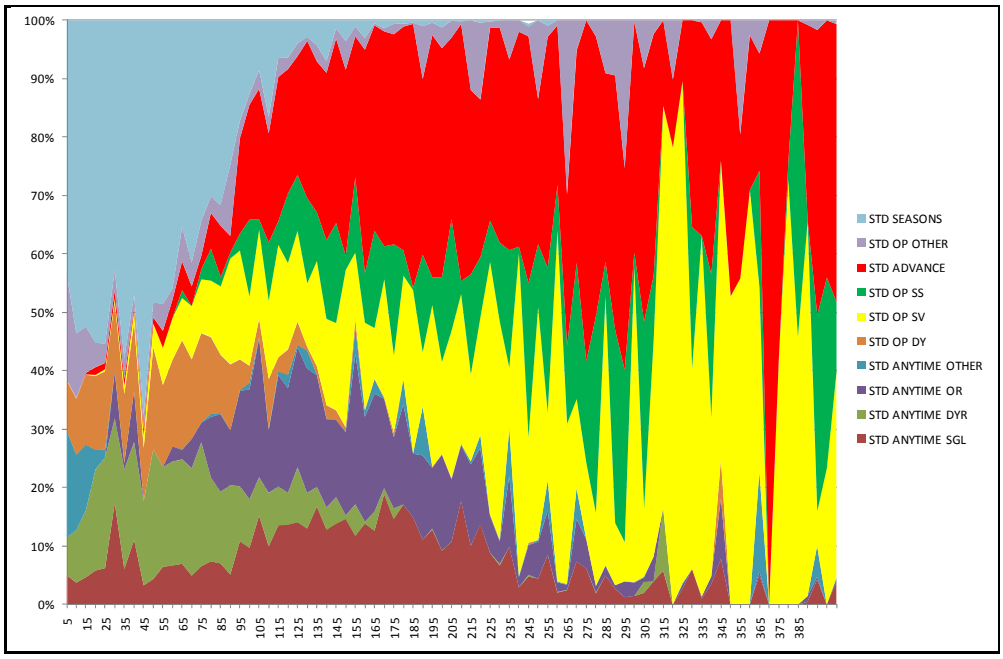
B1.54 The main ticket types in the current structure are shown in the table below, broadly in descending order of fare, though First Advance Fares can undercut Standard fares, season ticket fares per journey vary and Railcards obtain discounts across the board (limited to Standard in some cases).

Long distance		Short distance	
Single	**Return**	**Single**	**Return**
First Anytime		First Anytime Day	
First Advance			
Standard Anytime		Standard Anytime Day	
Standard Off-Peak		Standard Off-Peak Day	
Standard Super Off-Peak		Standard Super Off-Peak Day	
Standard Advance			
Season Tickets			
Railcard-discounted fares			

B1.55 In practice the short and long distance structures overlap. This is demonstrated by the Figures below, which show Standard revenue to London for periods 7 and 8, 2009/10 for the main ticket categories plotted against distance. The "spikiness" of these charts reflects the dominance of some large trip generators in certain distance bands.



Source: Lennon data



Source: Lennon data

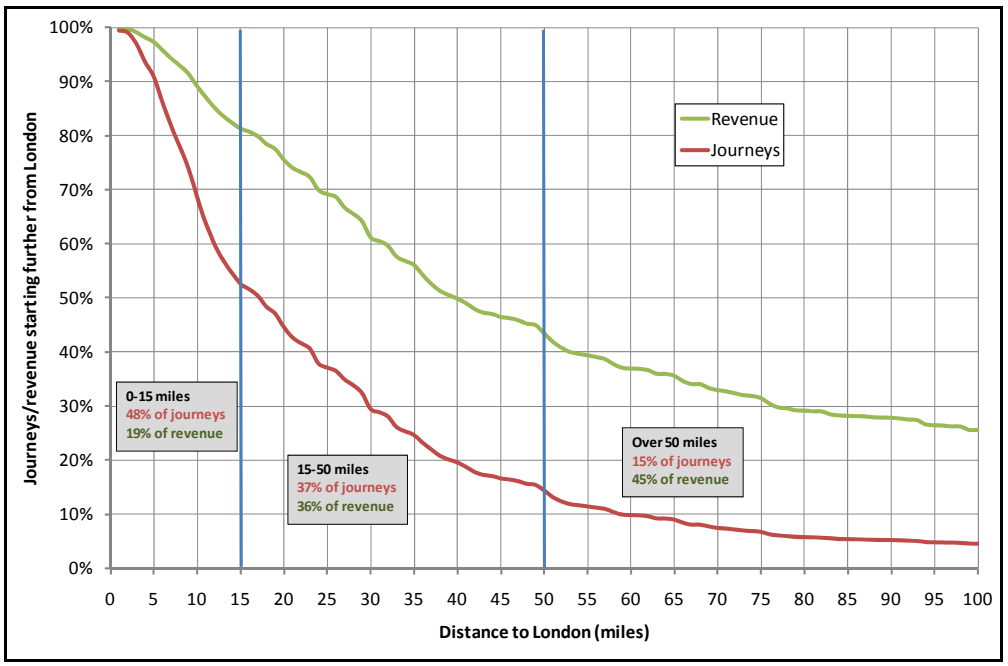
B1.56 The charts illustrate a number of points:

- The **Standard Anytime Day Single** is the only fare type available at all distances.
- 95% of **Standard Anytime Day Return** revenue to London is under 110 miles.
- Only 65% of **Standard Anytime Return** revenue to London is over 100 miles; most of the rest is on airport flows which, although in one day validity areas, need period tickets for the markets they serve.
- 95% of **Standard Off-Peak Day Return** revenue to London is for journeys of under 100 miles (69% under 50 miles), though there are examples on much longer flows (e.g. Exeter St David's to London via Southwest Trains, 173 miles).
- 95% of **Standard Off-Peak Return** revenue to London is for journeys of over 50 miles (74% over 100 miles) though there are examples of much shorter flows (e.g. Waltham Cross to London, 13 miles).
- 95% of **Standard Advance** fares revenue to London are for journeys of over 60 miles (and 88% over 100 miles).
- **Seasons** revenue lies predominantly in the short distance structure – 95% of Standard to London revenue is under 80 miles.

B1.57 The changeover between the two full fare ticket types (which can sometime also co-exist) is not necessarily at the same point as either where Savers come in or where Cheap Day Returns cease to be offered, so in the transition between the short and long distance structure there can be any combination of Anytime Day, Anytime, Off-Peak Day and Off-Peak, plus where there are Off-Peak tickets there may also be Super Off-Peak tickets. Broadly this mixing of elements from different structures mainly occurs in the 50 to 100 mile range.

B1.58 The Figure below shows the distribution of standard class revenue and journeys to London. Three distance bands are particularly identified:

- Up to 15 miles (approximately the London Travelcard boundary), which accounts for almost half of all journeys though only just under 20% of revenue - the implication is that these journeys contribute significantly to peak demand at the critical load points.
- Over 50 miles, which accounts for almost half of revenue (and more than half of that is over 100 miles) but only 15% of journeys (one third of which are over 100 miles) - this is where much of the innovation in fares structures discussed above has taken place.
- 15 to 50 miles, accounting for 36% of revenue and 37% of journeys - dominated by commuting, with season-tickets accounting for around half of revenue and a greater proportion of volume - little innovation here beyond introduction of Travelcards at the London end of the trip.



Source: Lennon data

Fares regulation

History of fares regulation

B1.59 As noted at the beginning of the previous section, regulation of rail fares has a long history, going back to the middle of the nineteenth century, and continuing for over 100 years.

B1.60 Formal regulation was abolished on formation of the British Railways Board in 1962. This led to the adoption of market pricing from 1968 and a 25 year period of innovation which saw the introduction of time-away fares, Railcards, Travelcards, Savers and advance purchase fares.

B1.61 While formal regulation had been abolished, government continued to influence the fares increases that were applied. These interventions pulled in two directions: concern that commuter fares should not rise excessively relative to inflation, and pressure to minimise subsidy requirements.

Fares regulation under OPRAF

B1.62 Formal regulation was reintroduced following privatisation to meet the Franchising Director's duty to ensure that fares were "reasonable". Regulation applied to Standard adult and child tickets – First Class fares and some Railcard discounts remained unregulated, though operators were required to participate in schemes (effectively Railcards) for the Disabled, Seniors and the Student/16-25 market. Regulation was (and still is) implemented through Schedule 5 of the Franchise Agreement/National Rail Franchise Terms.

B1.63 Two types of fares were regulated by both price and restriction:

- Tier 1 fares were individually regulated and covered weekly seasons and either Savers (where they existed at June 1995) or "the equivalent day ticket" (usually a Standard Open Return or Standard Day Return, but if neither existed, a Cheap Day Return), and applied to all flows that existed in June 1995, other than where Tier 2 regulation applied.
- Tier 2 fares were regulated in fares baskets as explained below - these applied to London, Cardiff, Edinburgh, Manchester, and Leeds.

B1.64 For Tier 2 the fares baskets contained all flows by designated ticket type and area from which each operator gained revenue in a defined base year. For London this covered:

- Season tickets:
  - Weekly, Monthly, Quarterly, Annual
  - To and from the London (Travelcard) area[7]
- Open Singles and Returns:
  - Within the London area
  - From the Suburban area[8] to the London area

B1.65 Essentially the same ticket types were covered for the other cities, but within a single boundary for each. For Manchester and Leeds this was the PTE area, and Cheap Day Returns and some local tickets were additionally included in the baskets. Other PTEs set their own fares.

B1.66 The maximum permitted increase for Tier 1 regulated fares was the cumulative effect[9] of the Retail Price index (RPI) for the first three years from January 1996 until the end of 1998, then RPI-1% for the next four years from January 1999 until the end of 2002. The increase permitted each January was based on the RPI in the previous July compared to the base year, i.e. RPI in July 1994.

B1.67 The same increase applied to the fares baskets in Tier 2, with additional flexibility to vary individual fares by up to 2% above RPI cumulatively provided this was balanced by reductions elsewhere. For the London fares baskets the permitted

[7] Within the Travelcard area, Travelcard prices are set by agreement between the operators and TfL according to the terms of the Travelcard Agreement.

[8] This surrounded the London Travelcard area covering stations where it was estimated that at least 25% of Standard fare were for commuting purposes and stretched up to 50 miles from London.

[9] Subject to 10p roundings.

percentage change was further adjusted by a yearly performance incentive from January 1998 to the end of 2002 (the FIAP regime).

The 2003 SRA Fares Review

B1.68 The SRA published its Fares Review in June 2003, setting out the changes to regulation that would apply from January 2004.

B1.69 The SRA's 2003 fares policy objectives can be summarised as:

- protect passengers where operators have market power
- redress the balance of costs between taxpayer and passenger
- allow innovation, particularly to improve capacity utilisation
- simplify process to reduce the administrative burden on operators
- reflect externalities (mentioned in relation to commuter fares)

B1.70 With respect to the first objective, the review concluded that Standard weekly seasons and most commuter fares in and around London would continue to be regulated.

B1.71 However, it questioned the regulation of Saver fares, concluding that it had constrained new and innovative customer-focused tickets (the third objective) and led to significant overcrowding on some routes (the "spurious peak" problem referred to earlier). It signalled an intention to work with train operators to develop proposals to address these problems, but meanwhile Savers would continue to be regulated.

B1.72 The review announced a change from a cap at RPI-% to RPI+1%, recognising the second objective above, and that continuing with below-inflation increases was economically unsustainable.

B1.73 The link between fares and performance (FIAP) was removed as it had not worked well. One area of weakness cited was long time lags between reported performance and the fares changes it influenced, so that higher increases might be applied at a time when performance was deteriorating or vice versa, causing confusion. In any case, there were other incentives in the franchise agreement for rewarding good performance or penalising poor performance, so FIAP was unnecessary.

B1.74 Another change was that all fares were to be regulated within baskets. Each train operator now has two fares baskets:

- a "commuter fares" basket contains those fares previously in Tier 2, i.e. urban commuter fares[10, 11].
- a "protected fares" basket contains those fares previously individually regulated in Tier 1 (weekly seasons and Savers where they existed in February 2003, or the full fare return ticket where a Saver did not exist in February 2003).

[10] For London, season tickets were now included to, from **and within** the London (Travelcard) area

[11] Some London operators previously had two commuter baskets – inner and outer

B1.75 Restrictions continued to be regulated for protected Saver returns:

- Valid for at least a month.
- Valid all day at weekends.
- Valid from no later than 1030 on any other day.
- Except they may be barred for any journey beginning between 1500 and 1900 on a weekday from London area stations (and also when travelling away from London stations between London and Reading, Watford, Luton or Stevenage).

B1.76 In most cases Saver Returns have now been rebranded as Off-Peak Returns under fares simplification. However we will continue to use the old terminology where necessary to distinguish from other tickets available in the off-peak period. For some operators it is the Super Off-Peak Return that is regulated, with a higher price Off-Peak Return available on additional services. Others do not offer a Super Off-Peak Return.

B1.77 The total of the fares within the regulated basket had to remain within a cap, which rose by RPI+1% each year, but no individual fare in the regulated basket could rise by more than RPI+6% in any one year.

B1.78 The baskets were simplified, in pursuit of the SRA's fourth objective, by only including fares which account for 95% of revenue from all regulated ticket types for the operator concerned. Protected fares baskets would only include those set by the operator but commuter fares baskets would still contain fares set by other operators. The baskets were also reweighted based on revenue from sales of regulated fares in 2002/3.

B1.79 First Class fares, advance purchase fares, Savers and weekly seasons where there was no equivalent fare in 2003, tickets (other than Travelcard) which include non-national rail elements (e.g. bus fares or a third party attraction), and discounted fares below the regulated fare level continued to be unregulated. However, in certain cases the regulated fare acts as a ceiling, e.g. outside the Saver barred period, an advance purchase fare above the Saver level would not sell.

B1.80 In summary, a simplified version of what is now regulated is shown in the table below. The yellow shading indicates the regulated categories, and beneath the blocks of yellow are the quasi-regulated fares. The fares above the top yellow block are unregulated.

Long distance		Short distance	
Single	**Return**	**Single**	**Return**
First Anytime		First Anytime Day	
First Advance			
Standard Anytime		Standard Anytime Day	
Standard Off-Peak		Standard Off-Peak Day	
Standard Super Off-Peak		Standard Super Off-Peak Day	
Standard Advance			
Season Tickets			
Railcard-discounted fares			

B1.81 Other conclusions drawn in the 2003 fares review were:

- There was no case for regulating long-distance full fare Standard Open Returns as car, coach, or air alternatives usually exist, it is reasonable to charge a premium for flexibility, many users of these tickets were business travellers who face similar or higher costs on other modes, long-run marginal costs are high, a very high proportion of industry revenue would then be regulated, and holding down prices could exacerbate overcrowding and stifle innovation.
- Fares should reflect long run marginal costs because of the long lead times involved in investment and the limited ability of passengers to respond to price changes in the short term – for example, by changing jobs, changing travel patterns or moving house; the SRA's research suggested that regulated fares were significantly below an economically efficient level i.e. below long run marginal cost, resulting in overcrowding and lack of incentives for investment.
- It was not practical to apply different increases in fare to different operators, for example to reflect different levels of investment or service quality, because of the extent of interaction between fares set by different operators - this was partly because of concern about railheading, particularly across the Travelcard area boundary and partly because of the overlap between different operators' fares baskets.
- An intention to work with TfL to develop zonal fares in the London area, beginning with a trial in one part of the national rail network in London.
- Interest in a National Railcard that is well-targeted, encourages road users to switch from cars to trains, does not lead to overcrowded trains, and does not reduce operators' revenue, but concern that a card available to all may be abstractive, regressive and increase subsidy requirements.
- Noted that fares regulation may need to be altered in future to accommodate changes following the introduction of smartcard ticketing in London and elsewhere, including a reference to "peak" and "shoulder peak" pricing which could spread demand and improve capacity utilisation, so reducing costs, but concluded that schemes were insufficiently developed to make specific changes at that time.

B1.82 In spite of the third conclusion in the previous paragraph, regulation at RPI+3% was subsequently introduced on the Southeastern franchise reflecting investment in new rolling stock, restoring yields which had been eroded by FIAP and as a precursor to RPI+3% elsewhere.

B1.83 More recently, the Secretary of State announced in October 2010 that RPI+3% pricing would apply to all fares baskets from January 2012 for three years.

The Ticketing and Settlement Agreement (TSA)

B1.84 There are conditions in every franchise agreement and passenger licence which require operators to participate in National Rail Enquiries, National Conditions of Carriage and the Ticketing and Settlement Agreement (TSA). Franchised operators are also required to participate in discount schemes for certain social groups, notably Seniors, Student/Young Persons, and the Disabled, which are currently satisfied by the respective Railcard schemes. These responsibilities are currently managed by ATOC and Rail Settlement Plan (RSP), under the governance of the Ticketing and Settlement Scheme Council (TSSC).

B1.85 Operators are required to provide prices for both through tickets (using more than one operator in series) and interavailable tickets (being able to use any operator for any section of route).

B1.86 Under the terms of the TSA, a lead operator is defined for every origin-destination flow. There are a number of criteria in the TSA selecting the lead operator, but it is generally the operator with the greatest commercial interest in the flow. The lead operator is responsible for setting the interavailable fares, which must then be accepted by all other operators on the route.

B1.87 Other operators are free to set "dedicated" fares at a lower price than the interavailable fare, but the lead operator can only do this for advance purchase fares or premium product fares i.e. First Class.

B1.88 The TSA also governs retailing arrangements. Outlets can be designated as either partial or impartial retailers. The TSA also defines commission rates.

B1.89 Finally, operators are still subject to competition law and may not collude when setting prices. This may lead to anomalies when different flows on a route have fares set by different operators, in addition to anomalies inherited from BR.

Issues to be addressed for future fares regulation

B1.90 The aim of this section is to identify a number of issues for later consideration, some of which illustrate some unintended consequences of fares regulation. These will be supplemented by additional issues arising from other workstreams.

Peak regulation

Issue 1: What is the potential for using fares in shoulder peak and core peak periods to both boost revenues and better manage demand?

B1.91 Currently there is no incentive, other than crowding, for season ticket holders to avoid travelling on high peak services. In principle, price can be used to spread demand, though evidence suggests that the price differentials would have to be large.

B1.92 In order to be at least revenue neutral, fares would need to rise in the high peak to balance any discounts in the shoulder peak. However, this would not necessarily apply to ordinary fares, which already have a peak/off-peak differential. Most passengers on commuter routes are currently using season tickets, and it is these journeys to which price differentials – increases as well as decreases – need to apply.

B1.93 One issue that needs to be considered is the availability of shoulder peak capacity, and the possibility that lower fares in the shoulder peak could "attract in" demand from the off-peak period and worsen crowding.

B1.94 We also noted earlier that stations within London account for a very large percentage of the total demand to central London. Any changes will therefore need to take account of pricing within London, and the within and outside structures will need to be carefully aligned.

B1.95 There are also some practical issues to consider including:

- Ensuring that customers understand what they are being charged and how this varies by time of day.
- Ensuring that they are not inadvertently penalised, for example, by service disruption.
- What happens when a passenger with (say) an off-peak season ticket wants to travel in the peak.
- How to check that the correct fare is being paid for the services used.

B1.96 These issues may well be eased by implementation on smartcards, bearing in mind issues raised earlier about use of prepaid or credit systems rather than fare calculation at the gate. Supplements for peak trains might nevertheless be charged on a PAYG basis. This would probably be simplest on a single leg structure although it is possible to conceive of return tariffs being implemented in this way.

B1.97 The appropriate tariff period is probably best defined by the time of touching in at the origin station, though touching out would be used to recognise the specific origin destination journey, which could also define whether the journey has traversed a critical load section (e.g. Woking to Waterloo v Woking to Wimbledon) and amend the charge accordingly.

B1.98 The remaining issue is whether to implement by price-differentiated season tickets, PAYG or some mixture of the two. For commuter journeys stretching up to 80 miles or more it may not be feasible to operate PAYG as in urban areas, as the absolute fare levels for each trip are high. However, some means of allowing off-peak and shoulder peak season ticket holders to upgrade easily to travel in the peak would be desirable.

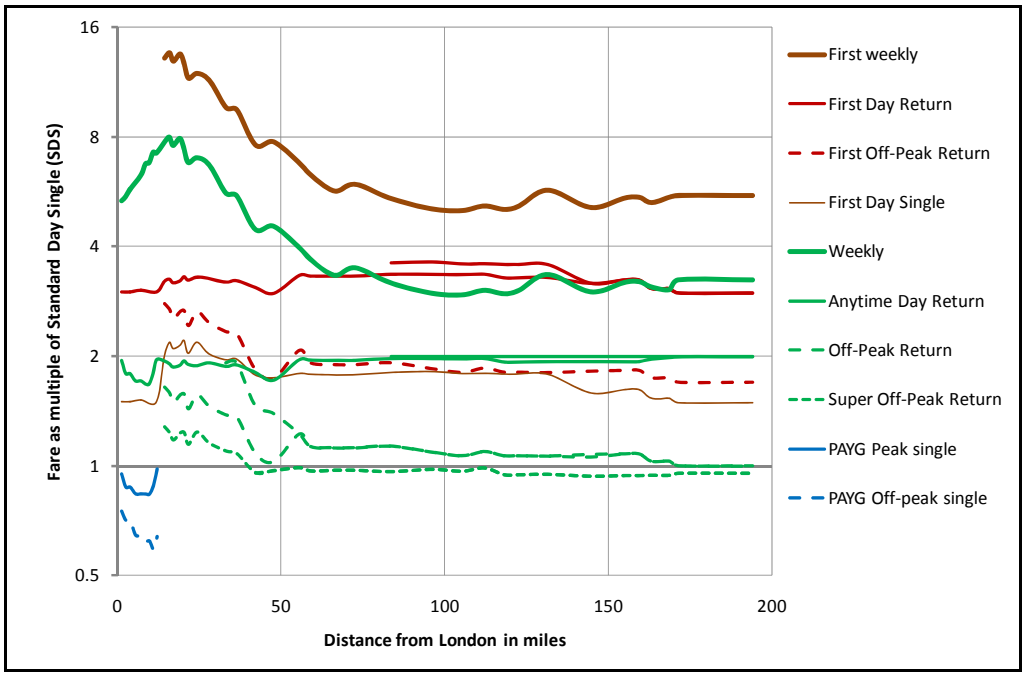
Issue 2: Is regulating season tickets and full fares (for most commuter journeys) the best approach, given changes in working patterns and the opportunity to manage demand with pay as you go?

B1.99 This is closely linked to the previous issue, where we noted that season tickets in their current form provide no incentive to avoid peak services. The relatively low number of journeys needed to justify buying a season ticket also tends to push passengers in that direction.

B1.100 The Figure below shows the position for the SWT London to Exeter route, where at short distances the weekly season is priced at eight singles, dropping to four singles at around 50 miles and even less for longer distances. So beyond 50 miles or so anyone making two or more round trips a week, and travelling in the peak, would be better off with a season ticket.

B1.101 However, current regulation limits the extent to which the season ticket or full fare can be priced up across a range of flows to achieve a "high peak" price. In fact, what seems to have happened by including both seasons and full fares in the commuter basket is that the latter have been priced up more than the former, reducing the season ticket to single fare multiplier.

B1.102 Regulation also acts to preserve the season ticket concept, and the dominance of season ticket demand limits operators' ability to manage demand. This suggests a move towards an off-peak season plus PAYG peak supplements as described earlier. It would be difficult to avoid offering an "Anytime" season as well, but this could be premium priced (and unregulated).



Source: South West Trains fares, 2010, reanalysed by Steer Davies Gleave

B1.103 There are no products specifically targeted at off-peak and part-time commuting. Carnets exist within a few parts of the network (e.g. ScotRail Flexi-pass), but have not been introduced on a more widespread basis because of concerns about revenue protection. With gating these ought to be feasible.

B1.104 Part-time peak period commuters making long distance journeys will find purchase of a season ticket attractive, as discussed above. However, most journeys are under 50 miles where the weekly season is a higher multiple of the single fare and it will often be cheaper to purchase a Standard Day Return, with the inconvenience of having to purchase on a daily basis. Regulation does not prevent operators offering a Carnet product, but doesn't encourage it either.

B1.105 Off-peak commuters may find season tickets less attractive than Off-Peak or Off-Peak Day tickets, which will usually be the cheapest option if they travel daily, but again the ability to buy a Carnet would increase convenience.

Issue 3: Is peak regulation aligned with areas where operators have potential market power?

B1.106 Mixing competitive and non-competitive flows within fares baskets allows headroom from the former to be reduced to allow higher increases to be targeted on the latter. This may be an economically efficient outcome, limited only by the cap on individual fares.

B1.107 Research by ITS Leeds argues that the cap on individual fares should be removed. Nevertheless a cap may be justified on equity or externality grounds (e.g. relief of road congestion), and operator practices are not guaranteed to be economically efficient if the cap were removed.

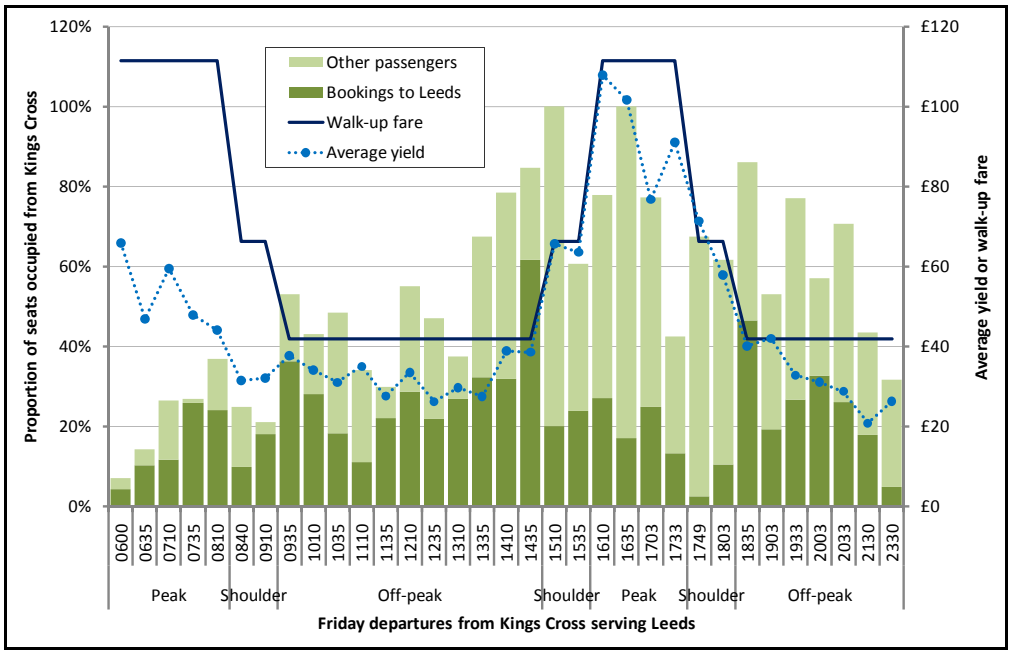
B1.108 In terms of raising revenue, bearing in mind the objectives of this study, it makes sense to focus increases on the commuter market where elasticities are low, though elasticities would be expected to increase as a result of progressive real price increases, offset to some extent by real income growth. A revenue-maximising strategy would continue increases until elasticities reached one.

B1.109 However, this is where the market power justification for regulation is strongest, particularly on services that already cover costs or where the operator pays a premium.

Off-peak regulation

Issue 4: Should off-peak fares be deregulated, or regulation relaxed?

B1.110 While the issue on commuter routes is about spreading a natural peak, on long distance routes there is a need to spread some artificial peaks. These occur on the first off-peak train in the morning and, from London, immediately before and after the period when off-peak tickets are restricted in the late afternoon/evening. The Figure below shows a typical pattern of demand for a long distance flow leaving London on Friday.



Source: East Coast

B1.111 The cause of these "spurious" peaks is the very large fare differential between the anytime and off-peak fares. This problem dates from the early days of introducing Saver fares, but has been exacerbated by significant real price increases applied to the Anytime fare whereas the Off-Peak fare was limited by regulation – one of the unintended consequences of regulation.

B1.112 The Figure shows the level of walk-up fares applicable in each time period. In this case the Anytime fare is applicable on the early morning departures. This then drops to the Off-Peak, and then the Super Off-Peak fare. The last of these is the regulated fare, and the first train on which it is available has the highest bookings of the morning. The highest peak bookings of the day are on the last train for which this fare is available before the restricted period, and the second-highest bookings are on the first train on which it is available in the evening.

B1.113 Operators can regulate demand within the restricted period by introducing advance purchase fares at a discount from the Anytime fare, though this may dilute revenue. They can also offer advance purchase fares at a discount from the Off-Peak fare on off-peak services other than the "spurious" peak trains. In both cases the aim is to attract demand away from the "spurious" peak trains, bearing in mind that a large proportion of demand on these trains has moved out of the peak period to avoid the high fares. However these actions alone do not appear to be sufficient to remove the problem and the regulated Off-Peak fare limits the price that can be applied to the "spurious" peak trains themselves.

B1.114 The issue is finding the right balance between protecting the availability and price level of a walk-up off-peak fare and operators' ability to apply yield management techniques to spread demand and avoid "spurious" peaks.

B1.115 This has already been discussed above, and was something that the SRA fares review suggested would be pursued. This effectively means deregulation or an easing of regulation of Off-Peak (Saver) fares. The question is whether competition

from coach, car or air is sufficient to ensure that competitive walk-up fares are retained.

B1.116 Alternatively is it acceptable to move to a position where the only flexible fare is the full fare? This might be made more acceptable by allowing advance purchase products to be available right up to departure time, provided that the appropriate quota has not closed.

B1.117 It is also arguable that only the full fare should be regulated, through the Standard Day Single, because operators have most market power during the peak. This would also bring long distance regulation into line with flows where there was no Saver in 2003.

The RPI-X formula

B1.118 The level of X in the RPI-X formula is a matter for government. However, we need to consider the implications of different levels of X that might apply in the future, and how this might affect the proposals for change.

B1.119 A legitimate issue for consideration in this study is whether X should vary from route to route, or more generally whether there is a case for local variations in regulation of fares.

Issue 5: Should there be variations in regulation related to quality differentials, levels of investment or strength of competition between routes?

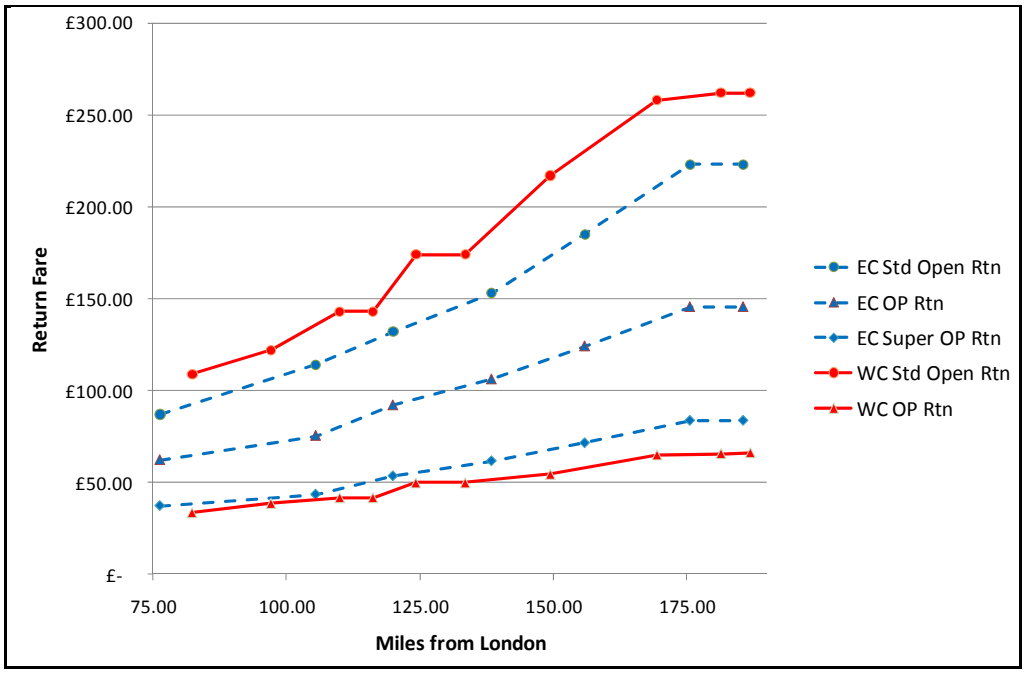
B1.120 As noted earlier, the SRA 2003 review argued that it was not practical to apply different increase on different routes because of the extent of interaction between fares set by different operators. Nevertheless, RPI+3% was applied to Southeastern, partly because of replacement of slam-door rolling stock with new rolling stock, and partly because fares per mile were lower than other routes due to FIAP. This was also a precursor to the RPI+3% nationwide which will apply from January 2012.

B1.121 Nevertheless it demonstrates that in some circumstances variations from RPI-X can be sustained, albeit that Southeastern is a relatively self-contained franchise, and where overlaps do occur these are mainly with Southern, operated by the same operator group. It would perhaps be appropriate, then, to take each case on its merits, and to consider the desirability and practicality of variations to RPI-X as part of the franchise competition.

Anomalies

Issue 6: How can regulation avoid the continuance of pricing anomalies from 1996 and the creation of new anomalies, which become more visible with online access?

B1.122 The converse of the above issue is that there are cases where the current level of pricing reflects historic costs, which no longer apply. An example is fare levels on the East Coast versus West Coast, which both operate electrified railways with fixed formation trains, but whose fares reflect historical differences, as well as different approaches by the previous and current franchisees. The Figure below shows that Anytime fares are much higher on West Coast than East Coast, but West Coast's Off-Peak Return is 25% cheaper than East Coast's Super Off-Peak Return.



B1.123 There are also many examples of being able to undercut the through fare between two points by rebooking at points en route. Our work for ATOC suggests that significant revenue could be at risk if this becomes widespread and with today's internet technology it could become much easier for prospective customers to identify the best rebooking points. However, allowing this "split ticketing" will significantly complicate retail transactions, as well as reducing revenue.

B1.124 Although there is flexibility within the fares baskets, there is limited incentive to resolve anomalies especially where they span the pricing structures of more than one train operator as they fear competition law, and some historic anomalies may require large fares changes. However, with increased ability of passengers to rebook (split ticket), then there may be a revenue argument for resolving these anomalies.

B1.125 Operators will give priority to maximising the revenue from the basket, which may create new anomalies, and there are examples where the price of some unregulated fares may be influenced by regulated ticket types.

Absolute fare levels

Issue 7: Should the absolute level of fare be regulated, e.g. pence per mile against some benchmark for each key ticket category?

B1.126 This could be another approach to harmonise fare levels between routes, or to recognise factors such as cost differences that justify differences in fare levels between routes. In principle it could be used in conjunction with the RPI-X formula, or instead of it. It plays to ideas of fairness, though there may be tension with other objectives, such as peak-spreading, which imply higher peak fares for overcrowded services.

B1.127 The prescribed level of fare would be a maximum for each fare type, allowing operators to charge lower fares where market conditions and costs justify it. It is not entirely clear how this level would be set, though it could include international

or intermodal comparisons. Where there are existing fares above the prescribed level, there may be revenue reductions associated with complying with it.

Innovation

Issue 8: Does regulation inhibit further fares simplification (e.g. single leg pricing), or innovation using new technologies (e.g. smartcard pricing by journey leg), and if so, how could this be rectified?

B1.128 It could be argued that the structure of regulation limits opportunities for innovation by blocking radical change and preserving a particular fares structure.

B1.129 One example is single leg pricing. Having a mixture of single and return fares with singles priced above half the return fare makes the choices facing prospective travellers complex. On the other hand, allowing a combination of a peak single in one direction with an off-peak single in the other may be abstractive compared to purchase of the peak return the same journey.

B1.130 In order to make this revenue neutral, the price for some journeys may need to rise substantially, and return fares would be abolished, neither of which is compliant with current regulation. For example, the Standard Anytime and Off-Peak Singles would be set at above half the current return fares, so that:

- Fares for peak outward/peak return trips would rise compared to Anytime Return (probable revenue gain)
- Fares for peak outward/off-peak return trips could fall or rise compared to Anytime Return (possible revenue loss as more likely to fall)
- Fares for off-peak outward/off-peak return trips would rise compared to Off-Peak Return (probable revenue loss)

B1.131 Revenue risks are reduced for long distance operators as they already offer Advance fares on a single leg basis, and West Coast offer a "Half Saver" single, at half the Off-Peak Return fare, that can be combined with an Advance fare for the other leg of the journey, but cannot be sold on its own. These changes appear to have been successful from these operators' perspectives.

B1.132 While risks may be greater at shorter distances, fares within London have already successfully moved to a peak and off-peak single basis (for Oyster) and also been zonalised.

The TSA

Issue 9: What is the impact of the TSA on stakeholders, for example constraints on lead operators versus secondary/open access operators; retailing arrangements, including commission (which may not reflect cost of sale, particularly for complex reservation linked products)?

B1.133 The eight issues above focus on the level and structure of fares, as controlled by the RPI-X formula or in terms of pence per mile.

B1.134 However, there are many aspects of regulation that are implemented through the Ticketing and Settlement Agreement. These include fare setting arrangements, commission levels, requirements to participate in certain Railcard schemes, and details of these schemes such as card price and discount level.

B1.135 We understand the work is in progress between DfT and ATOC to streamline the TSA.

How has fares regulation performed?

B1.136 Here we consider how fares regulation has performed against the objectives set out in the 2003 SRA fares review. This is a high-level assessment, based on the foregoing.

B1.137 The balance of funding may move towards the passenger from the taxpayer as a result of RPI+1% increasing regulated fares in real terms.

B1.138 Some protection is offered to commuters where operators have market power, through the overall basket limits and the limits placed on individual fares, but there is also scope within the fares baskets to focus the largest increases on the least elastic markets.

B1.139 It seems unlikely that the policy has had any benefits in terms of reflecting externalities, as real fares increases will have reduced demand compared to a continuation of the previous policy. However, this was not stated as a formal objective but only mentioned in relation to commuter fares.

B1.140 Finally, there does not appear to be any progress on allowing innovation, particularly to improve capacity utilisation.

APPENDIX

C

INTERNATIONAL, REGIONAL AND MODAL COMPARISONS

C1 INTERNATIONAL, REGIONAL AND MODAL COMPARISONS

International comparisons

C1.1 As part of our literature review we revisited our own previous research into "Comparisons between fares and ticketing in Britain and continental Europe", a study for Passenger Focus which reported in February 2009 and was directed and managed by members of our current study team.

C1.2 The work focused on the August 2008 fares, service frequencies and service speeds of the railways of the eight largest economies in Europe, comparing Great Britain with France, Germany, Italy, the Netherlands, Spain, Sweden and Switzerland. Working only from public data on fares available in the market place, it produced a series of detailed comparisons of fares and other journey characteristics for a number of sample journeys in different distance bands. The study did not include:

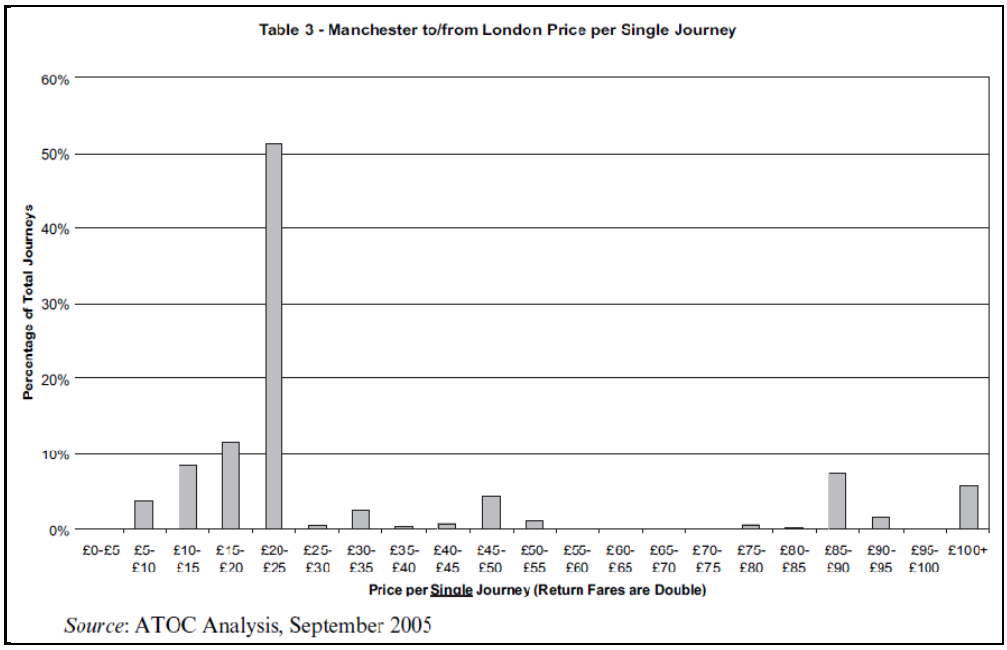
- Systematic comparison of average fares at an aggregate level, or of fares types.
- Sales or revenue data or a rigorous basis on which to estimate average fares or "yields" for the mix of ticket types actually sold in each country.
- Cost data, or any attempt to compare fares revenues with costs.
- Objectives or principles used to set national, regional and local fares.
- Other than London's Oystercard, identification or examination of smartcard technology in relation to any of the journeys studied.

C1.3 The study also noted some of the underlying difficulties of comparing fares in different countries, including in particular:

- The choice of fares for comparison
- The treatment of differences in income levels and exchange rates

C1.4 The Figure below illustrates the issue of which fares are chosen for comparison.

FARES BETWEEN MANCHESTER AND LONDON, 2005



Source: ATOC analysis, September 2005, from Transport Select Committee 2006

C1.5 The Figure, presented in evidence to the Transport Select Committee in 2006, shows that the high Anytime fares which tend to be quoted in comparisons are paid only by a small proportion of passengers, the majority of whom benefit from cheaper Off-Peak or Advance fares.

C1.6 Similar issues arose in examining the fares of Sweden, the comparator with the most liberal system of fares regulation. Former incumbent SJ has a monopoly on long-distance services and its fares are free from regulation. Long-distance fares are constrained only by interavailability with local fares specified by the counties, by competition with other modes, and by the price elasticity of demand. SJ makes extensive use of yield management, and fares for identical journeys vary by a factor of at least 7:1.

C1.7 Variations of this type mean that the only fares consistently available throughout the comparator countries were fully flexible “walk-up” open singles and returns, valid on any train. In Great Britain these are not regulated at long distances and tend to be set at prices required to ensure that space remains available on high peak trains.

C1.8 The treatment of differences in income levels and exchange rates can also heavily influence the apparent relative levels of fares. We have reviewed the original study to take into account, as far as possible, changes in these factors, and in particular change in the rates of exchange between the pound and the currencies used in the comparator countries, the euro, Swedish Krona and Swiss Franc.

C1.9 The original study compared fare levels on the basis of their affordability relative to average incomes in each comparator. Affordability measured on this basis is dependent on changes in disposable income but independent of exchange rates. The Table below shows in detail how this calculation has been applied on practice for a hypothetical €100 rail fare in France.

CALCULATION OF RELATIVE AFFORDABILITY OF RAIL FARES

Item	August 2008	December 2010
French fare	€100	€100
Average exchange rate €/£ over previous 12 months	1.33	1.16
French fare converted to sterling	£75.16	£86.21
French disposable income	€25,500	€25,000
French disposable income converted to sterling	£19,165	£21,978
Great Britain disposable income	£20,440	£20,440
Adjustment for disposable income	1.06	0.93
French fare adjusted for disposable income	£80.00	£80.00

C1.10 We have sought updated information on disposable incomes in the comparators but have identified none more recent than that provided by Eurostat for 2007. The overall effect is that, irrespective of changes in exchange rates, a €100 fare in France identified in the original study remains equivalent, in affordability terms, to an £80 fare in Great Britain, and that the conclusions of the original study on the relative levels of fares remain unchanged.

C1.11 The February 2009 study's Executive Summary included the principal findings summarised overleaf.

FARES IN BRITAIN AND CONTINENTAL EUROPE, 2008

Summary of main findings on fares in Great Britain

Relative fares depend on terms and conditions of use:

- Anytime long distance fares are significantly more expensive than elsewhere.
- Anytime day return fares are among the highest in Europe.
- "Walk-up" fares with some restrictions are more competitively priced.
- Off-peak fares are often comparable to or better value than elsewhere.
- Advance fares, especially to London, are among the lowest.

The variability of walk-up fares is highest:

- London to Manchester differential of 3.5:1 between Anytime and Off-Peak returns.

The variability of advance purchase fares can be even higher:

- London to Leeds differential of 10:1 between Anytime and cheapest Advance fare.

For long distance passengers:

- Highest frequencies (London to Birmingham and Manchester has since risen to 3/hour).
- Earlier arrival times and later departure times.

For London commuters:

- Season tickets are significantly more expensive than to other European cities.
- Highest frequencies.
- Earliest first trains and latest last trains.

Commuting into the principal cities

C1.12 We examined fares for commuting into the principal city in each country at three distance bands as summarised in the charts below, comparing:

- Unrestricted fares for day (purple), weekly, monthly and annual travel (blue)
- Any cheaper fare for return travel outside peak periods (green)

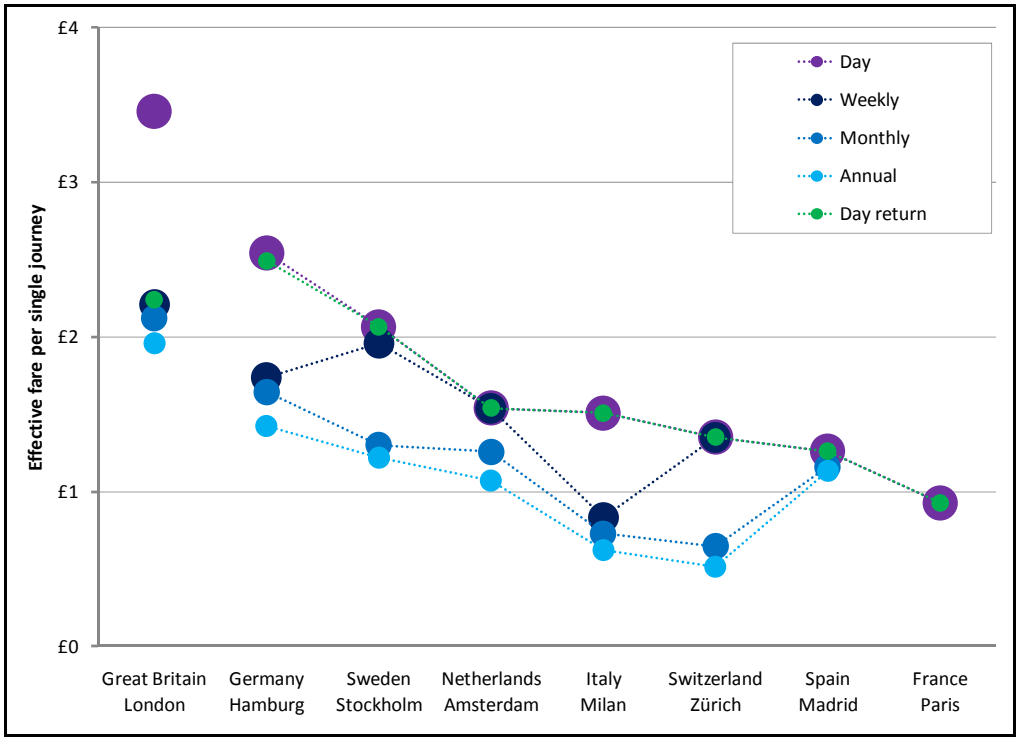
C1.13 Each of the following charts shows the data for London followed by the other cities in descending order of the unrestricted day fare, which is generally the most expensive. There is no equivalent of a weekly season ticket in Madrid, and we have for clarity omitted period tickets in Paris, where the multimodal "Carte Orange" is priced at a premium to the rail day fares.

C1.14 The first chart compares effective fares per single journey for commuting into the principal city from distances of 5-16 kilometres, normalised for distance and disposable incomes. London is consistently the most expensive city, but is the only one to offer a material reduction in day fares for off-peak travel (green).

C1.15 The second chart overleaf repeats the analysis for commuting from distances of 17-40 kilometres. London is again the most expensive city, but the extent of discounting of off-peak travel is greater than at shorter distances. Long period season tickets cost around four times as much in London as in Zürich, Milan and Stockholm.

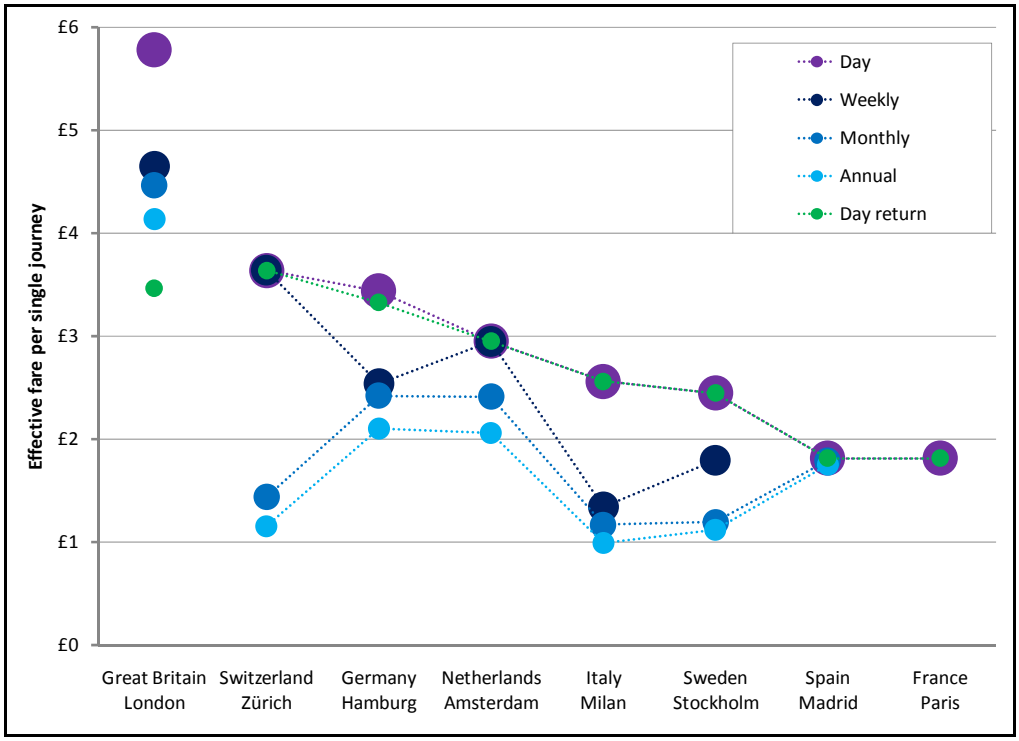
C1.16 The third chart, overleaf, repeats the analysis for commuting from distances of 41-80 kilometres, showing a broadly similar pattern.

COMMUTING INTO PRINCIPAL CITIES FROM 5-16 KILOMETRES, 2008



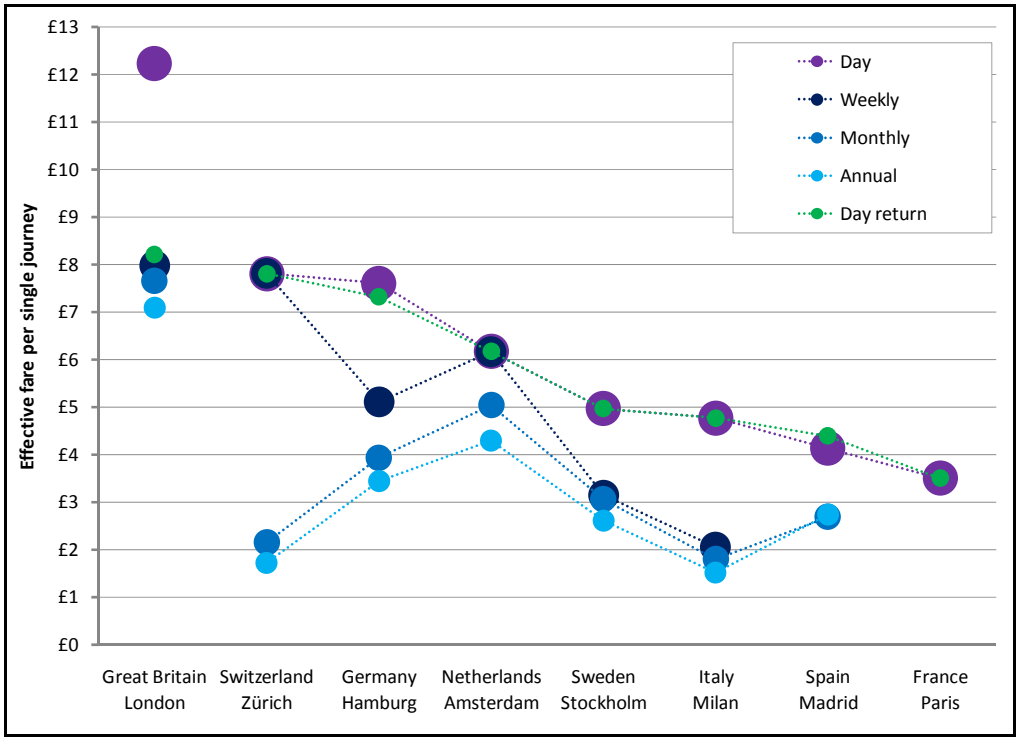
Note: small sample, normalised for journey length and disposable income

COMMUTING INTO PRINCIPAL CITIES FROM 17-41 KILOMETRES, 2008



Note: small sample, normalised for journey length and disposable income

COMMUTING INTO PRINCIPAL CITIES FROM 41-80 KILOMETRES, 2008



Note: small sample, normalised for journey length and disposable income

Long-distance travel into the principal cities

C1.17 We examined walk-up fares for a day trip into the principal city in each country from five cities at distances over 160 kilometres, normalised for a journey length of 430 kilometres. The results are summarised in the three charts below.

C1.18 The first chart, overleaf, compares walk-up fares for a day trip to the principal city allowing:

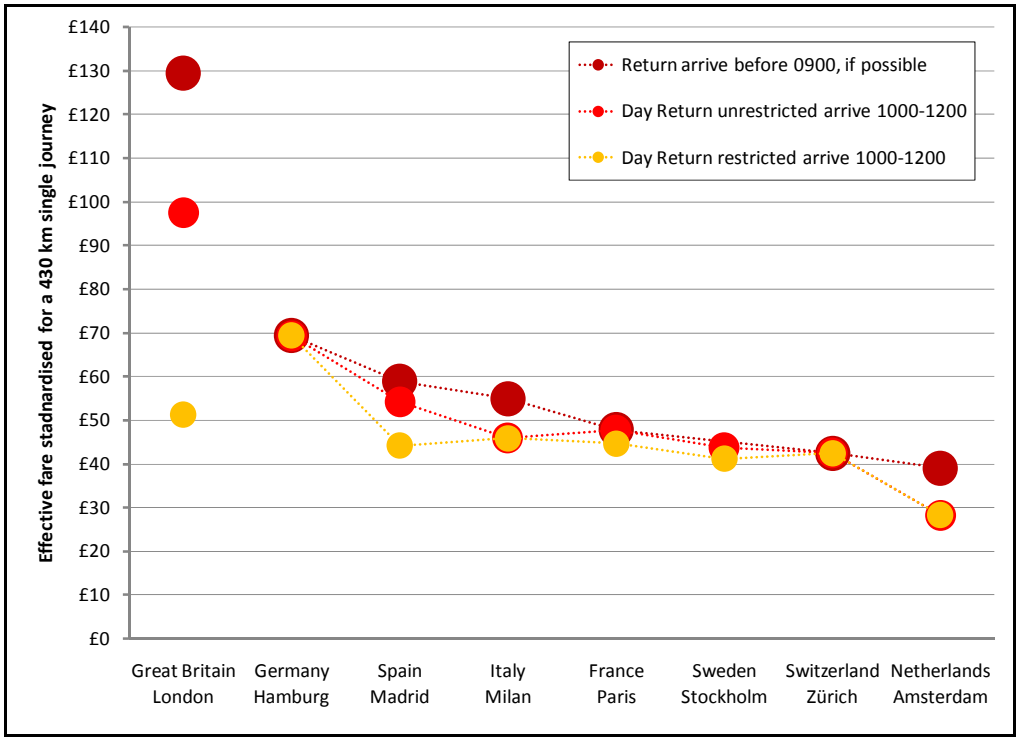
- Arrival before 09:00 (this was not possible in Stockholm)
- Arrival on any train in the period 10:00 to 12:00
- Arrival in the period 10:00 to 12:00 but with return restrictions

C1.19 Early morning or unrestricted day travel to London is more expensive than the comparator cities, but the much greater discounts available in Great Britain mean that fares are little higher than in some other countries if return restrictions are accepted.

C1.20 The second chart overleaf, on the same scale, compares advance purchase single fares bought on the day of travel or a week or a month ahead, and the cheapest fares we found for each trip. Travel to London is most expensive if booked immediately before travel but if bought a week or more in advance is cheaper than everywhere except Stockholm and Paris, where deeply-discounted tickets are also available. The cheapest fares in the sample were to London.

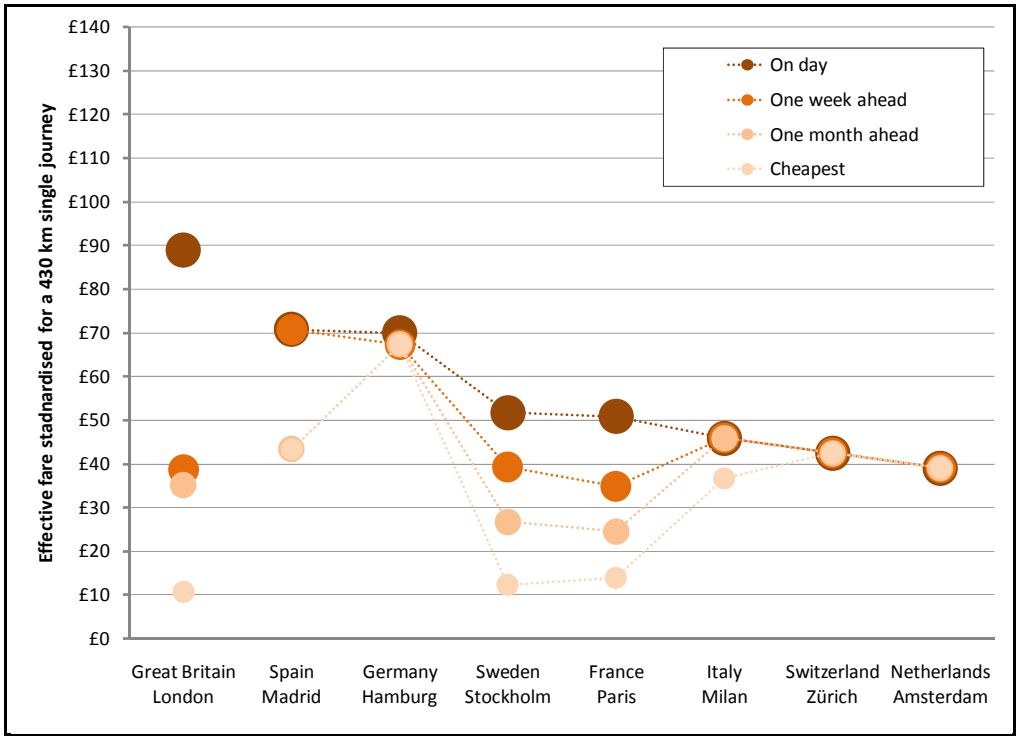
C1.21 The third chart repeats the analysis for advance purchase return fares. Travel to London is often the cheapest, even taking into account the discounts available in Stockholm and Paris.

TRAVEL TO PRINCIPAL CITIES, WALK-UP FARES, 2008



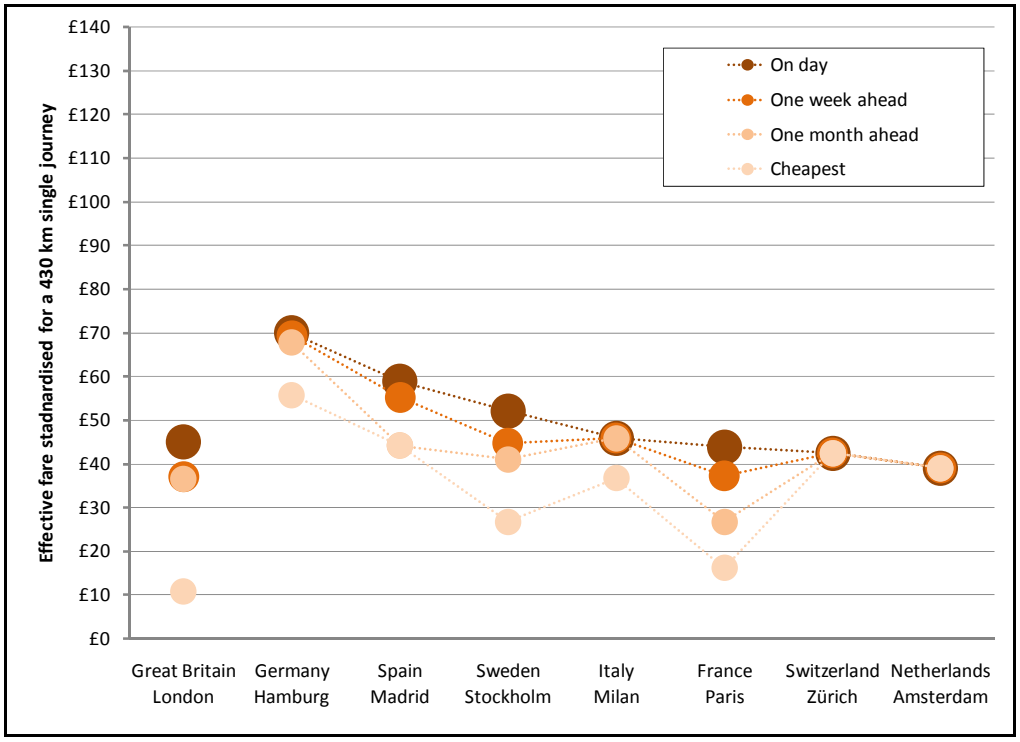
Note: small sample, normalised for journey length and disposable income

TRAVEL TO PRINCIPAL CITIES, ADVANCE SINGLE FARES, 2008



Note: small sample, normalised for journey length and disposable income

TRAVEL TO PRINCIPAL CITIES, ADVANCE RETURN FARES, 2008



Note: small sample, normalised for journey length and disposable income

Long-distance travel into the second cities

C1.22 The three charts overleaf repeat the above analysis for a second city, comparing Birmingham in Great Britain with second cities in other countries, normalised for a journey length of 390 kilometres.

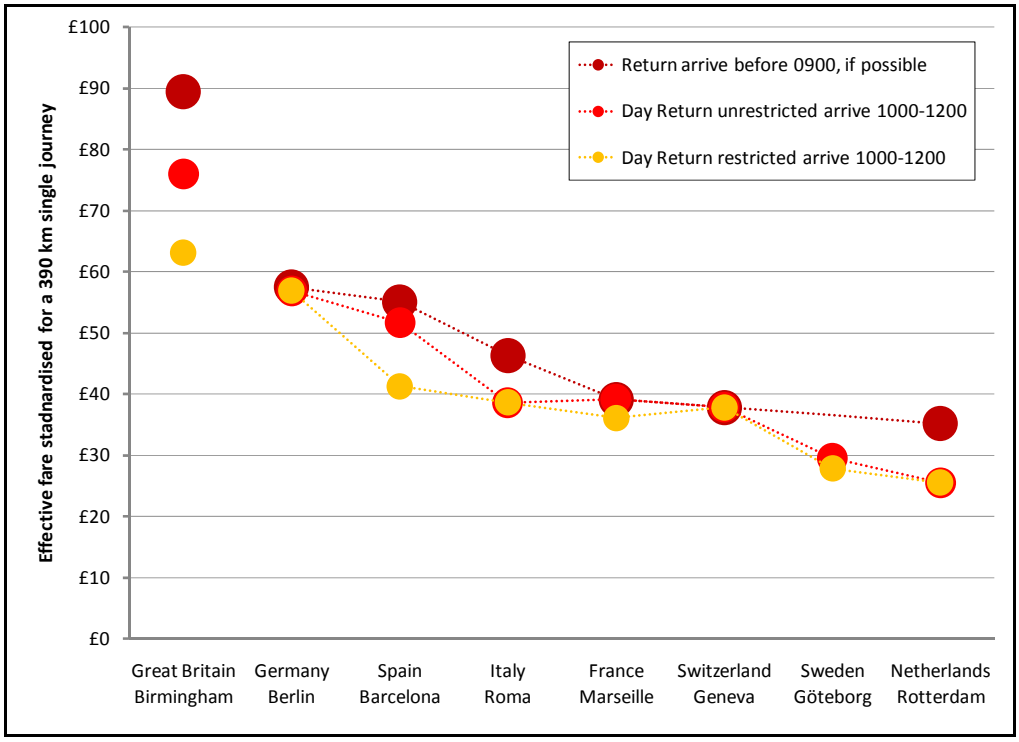
C1.23 The first chart compares walk-up fares for a day trip to the principal city allowing:

- Arrival before 09:00 (this was not possible in Göteborg)
- Arrival on any train in the period 10:00 to 12:00
- Arrival in the period 10:00 to 12:00 but with return restrictions

C1.24 Walk-up fares to Birmingham are consistently higher than to the comparators, partly because discounts for restricted tickets to Birmingham are less than those shown to London above.

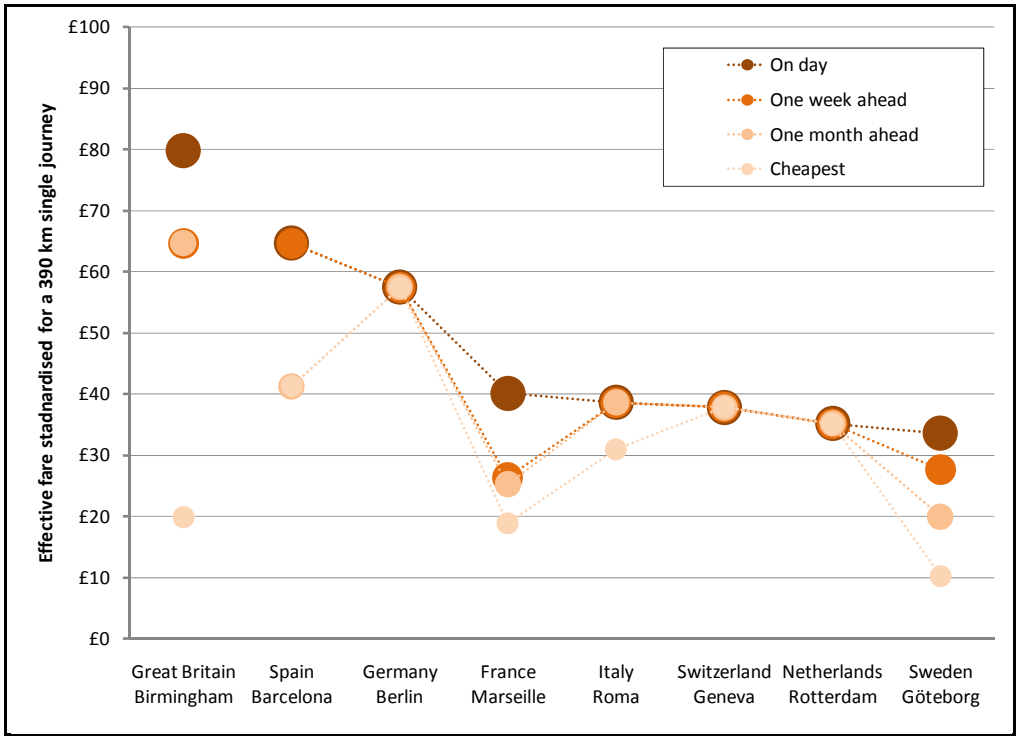
C1.25 The second and third charts show that greater advance purchase discounts are available to Birmingham than the comparators, and the cheapest advance purchase return fares to Birmingham are cheaper than those to any other city. As with travel to London, it is only in France and Sweden that significant discounting is available for advance booking.

TRAVEL TO SECOND CITIES, WALK-UP FARES, 2008



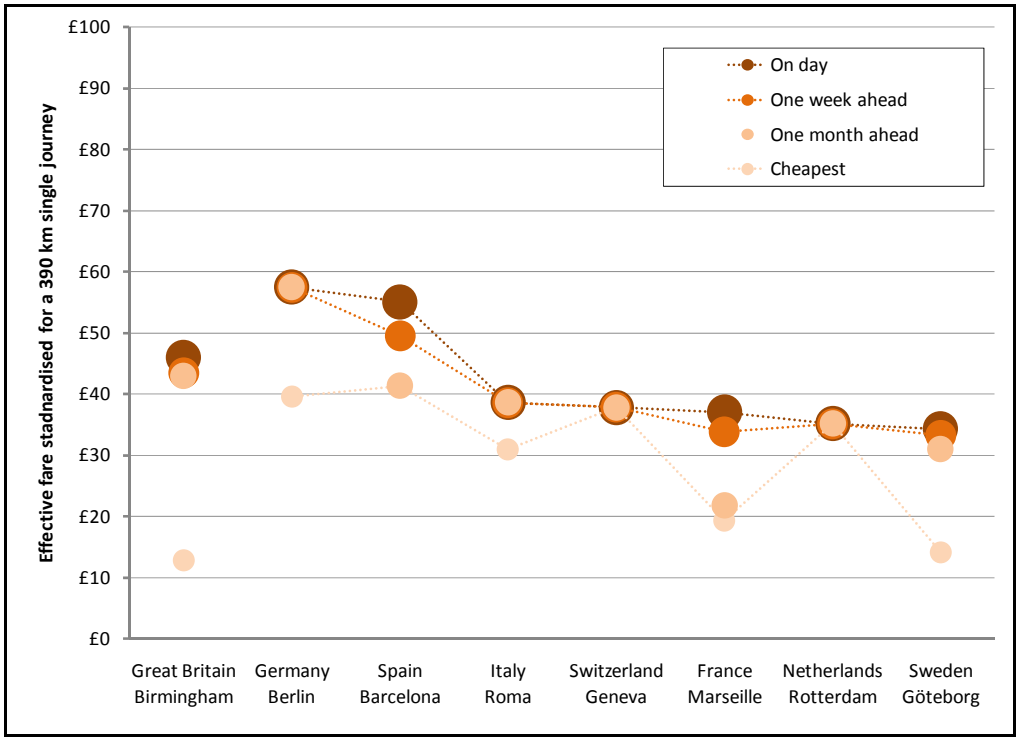
Note: small sample, normalised for journey length and disposable income

TRAVEL TO SECOND CITIES, ADVANCE SINGLE FARES, 2008



Note: small sample, normalised for journey length and disposable income

TRAVEL TO SECOND CITIES, ADVANCE RETURN FARES, 2008



Note: small sample, normalised for journey length and disposable income

Comparisons between regions in Great Britain

C1.26 We also revisited "Regional commuter fares and ticketing comparisons on Great Britain", a study for Passenger Focus which reported in January 2009. The study examined commuter travel to cities in different regions in three distance bands. It had no access to ticket sales or revenue data and hence no basis on which to estimate average fares for the mix of ticket types sold on each journey. In addition, the sample of London fares differed from that used in the European study described above.

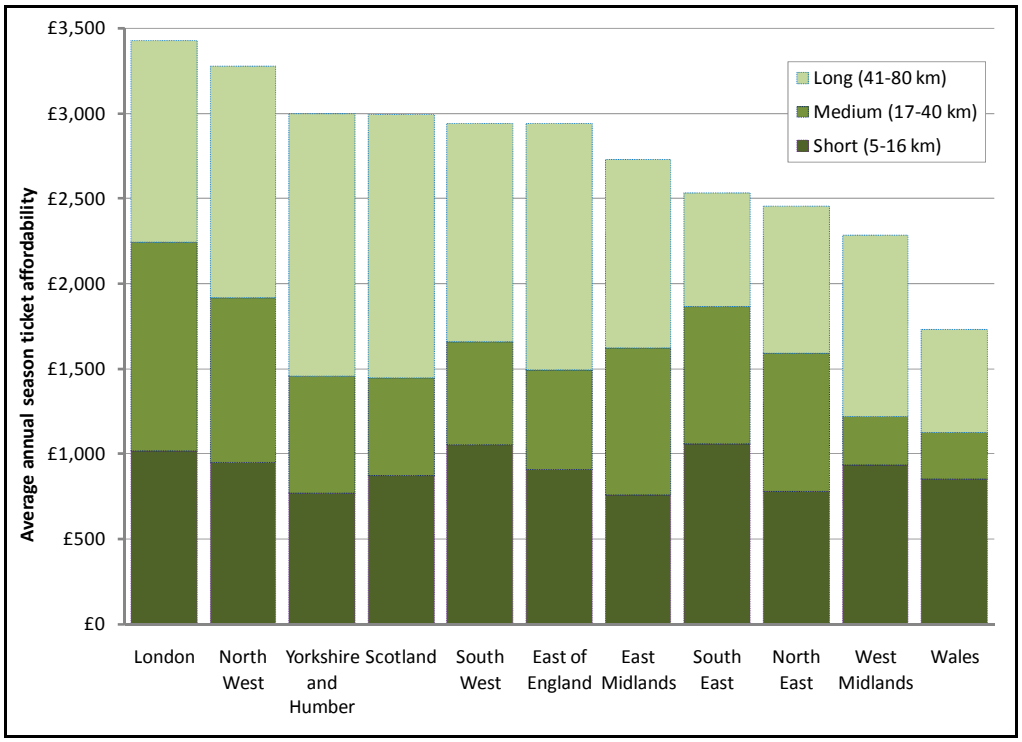
C1.27 The principal findings are summarised in the table overleaf.

RESEARCH ON REGIONAL FARES, 2008

Summary of main findings
Commuter fares: • London has the highest unrestricted commuter fares at all distances. • Non-London travel in the South East is cheaper than elsewhere.
Medium and long distance season tickets: • London has the highest fares. • Wales generally has the lowest fares.
Restricted fares: • Long distance fares to London are more expensive than elsewhere. • Short and medium distance fares for arrival 10:00 to 12:00 are similar everywhere.
Service frequency and length of service day: • London has more frequent service, at all distances, than other regions. • Services elsewhere are more limited, with a later start and earlier end.
Across the regions, average service speed is less variable than average frequency.

C1.28 The study identified prima facie evidence of regional variations in the affordability of season tickets, which are illustrated in the Figure below. This suggests that season ticket prices are highest for commuting into London, but not to other places in the South East region, and lowest for commuting in Wales.

REGIONAL VARIATIONS IN SEASON TICKET AFFORDABILITY, 2008



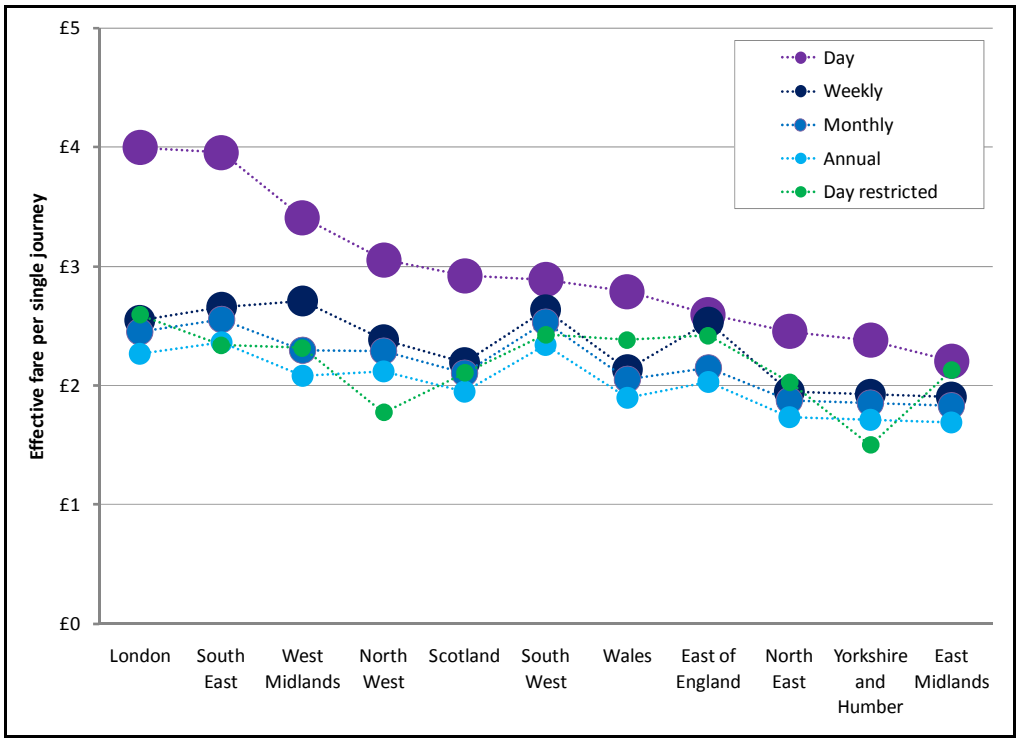
Note: small sample, normalised for journey length and disposable income

C1.29 We also examined fares on regional services at the three distance bands used in the European comparisons.

C1.30 The first chart below compares effective fares per single journey for commuting from distances of 5-16 kilometres, normalised for distance and disposable incomes. For day travel, London is consistently the most expensive city, followed by fares to other places in the South East. There is less variation in fares for weekly, monthly and annual travel. The second and third charts, overleaf, show that the patterns of regional variation remain broadly similar for commuting at longer distance of 17-40 and 41-80 kilometres. However, the different regional rankings in each chart suggest that there is as much variation within the regions as between them, and apparent differences may merely be driven mainly by the sample of flows chosen for each comparison.

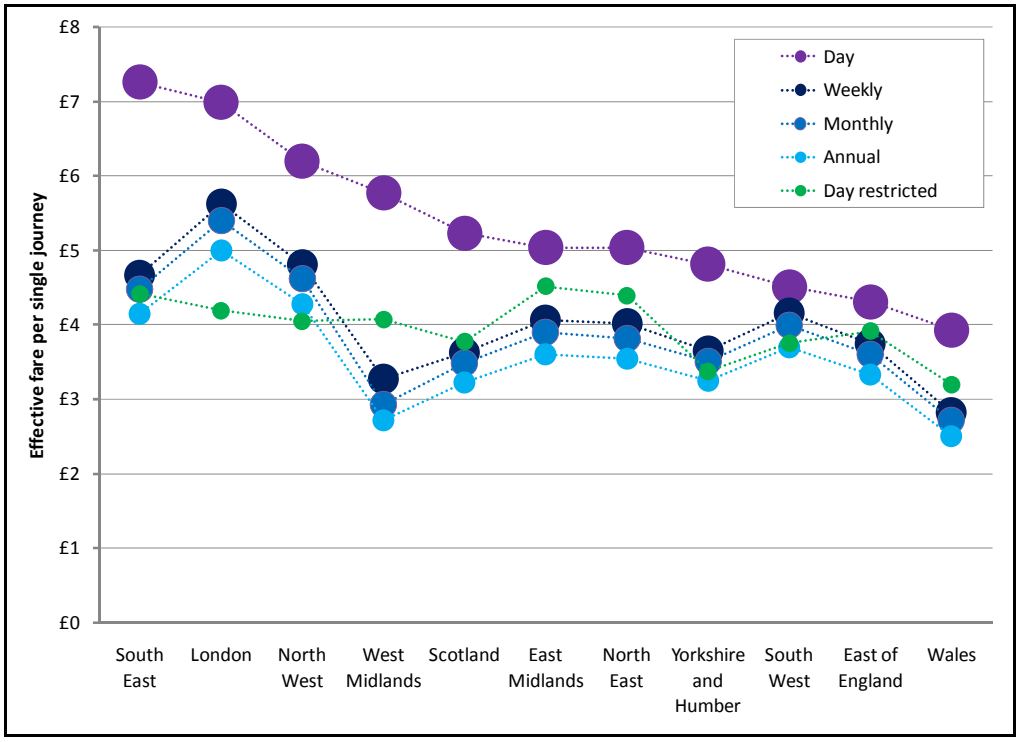
C1.31 We note that the market level of rail fares sustainable against other modes may vary between regions, reflecting inter alia local policy and provision such as road capacity, speed limits and parking charges, and supported bus services and fares. The recommendations of the industry standard Passenger Demand Forecasting Handbook (PDFH) are based on research showing that price elasticities of demand are higher for travel not involving London, suggesting that scope to raise fares revenue may be limited in some regions.

COMMUTING TO PRINCIPAL CITIES FROM 5-16 KILOMETRES, 2008



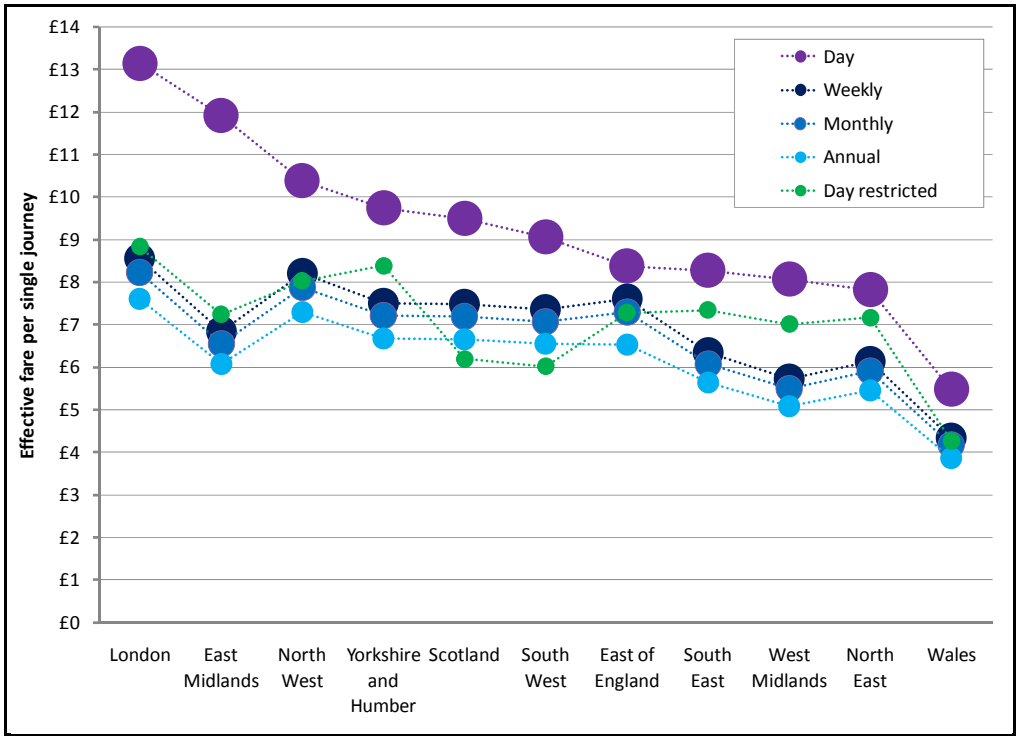
Note: small sample, normalised for journey length and disposable income

COMMUTING TO PRINCIPAL CITIES FROM 17-40 KILOMETRES, 2008



Note: small sample, normalised for journey length and disposable income

COMMUTING TO PRINCIPAL CITIES FROM 41-80 KILOMETRES, 2008



Note: small sample, normalised for journey length and disposable income

Comparisons between modes

C1.32 As part of this study we carried out new research comparing, for cities in Great Britain and on the continent:

- Rail, bus and off-peak road journey times
- Rail fares, bus fares and motoring costs including and excluding parking

C1.33 The comparison of rail fares, service frequencies and service speeds described above found that these were sufficiently consistent in each major city, whether in continental Europe or in Great Britain, to allow us to draw clear conclusions about international or regional differences.

Comparison of journey times

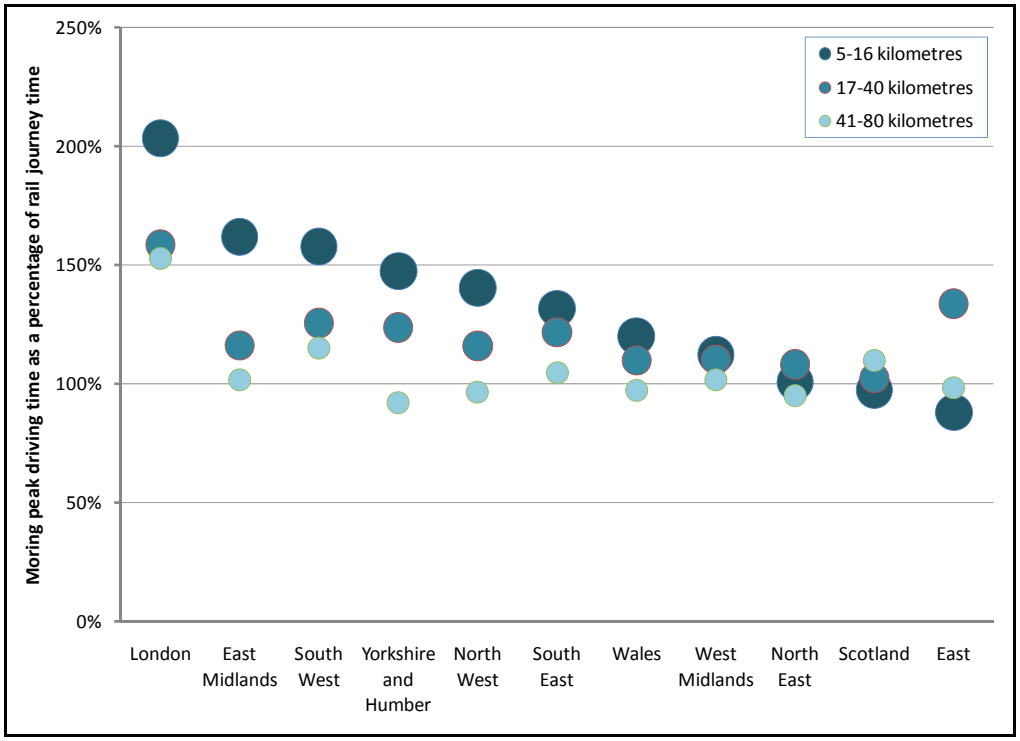
C1.34 We found some consistency of patterns of rail and road journey time, which are summarised in the charts below.

C1.35 The first chart compares, for a sample of commuter journeys in three distance bands, AM peak driving times and rail journey times. At short distances in London, rail is on average twice as fast as car, but in other cities this advantage is less and in some cases rail is on average slower than car.

C1.36 The second chart, overleaf, suggests that rail's journey time advantage may be eroded at least slightly in the off-peak when roads are less congested.

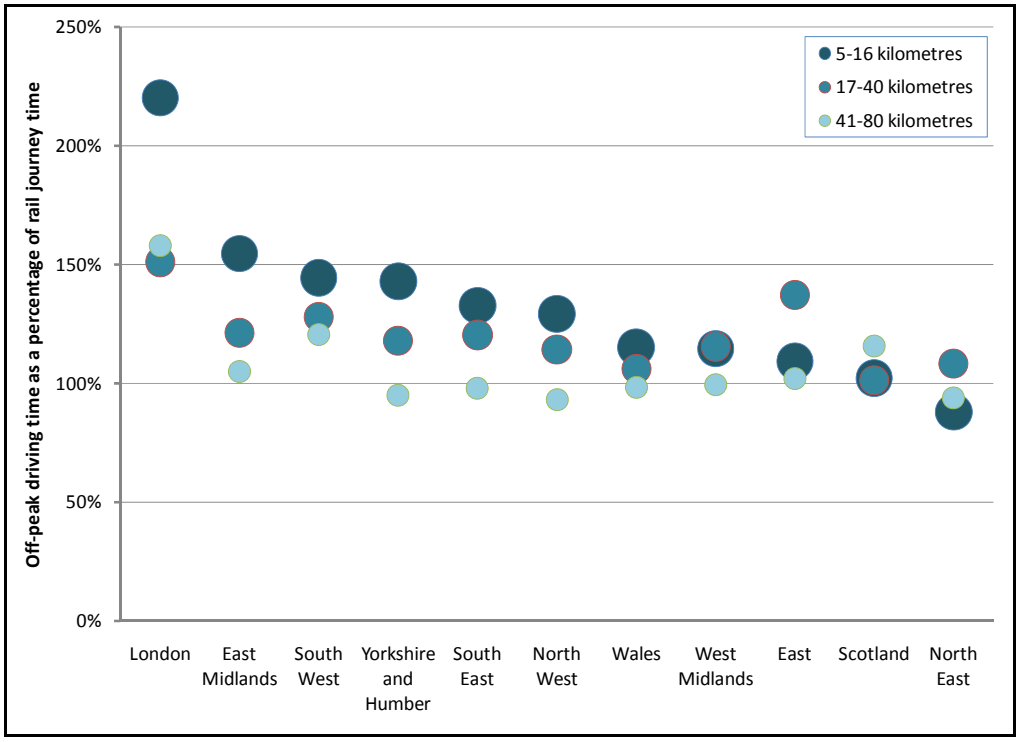
C1.37 The third chart repeats the second chart, replacing regional centres with the principal European cities studied. At equivalent distances, driving times in and to London, Europe's largest city, are consistently longer than to the other principal cities, for many of which car appears consistently faster than train.

RAIL AND CAR JOURNEY TIMES BY REGION, AM PEAK, 2010



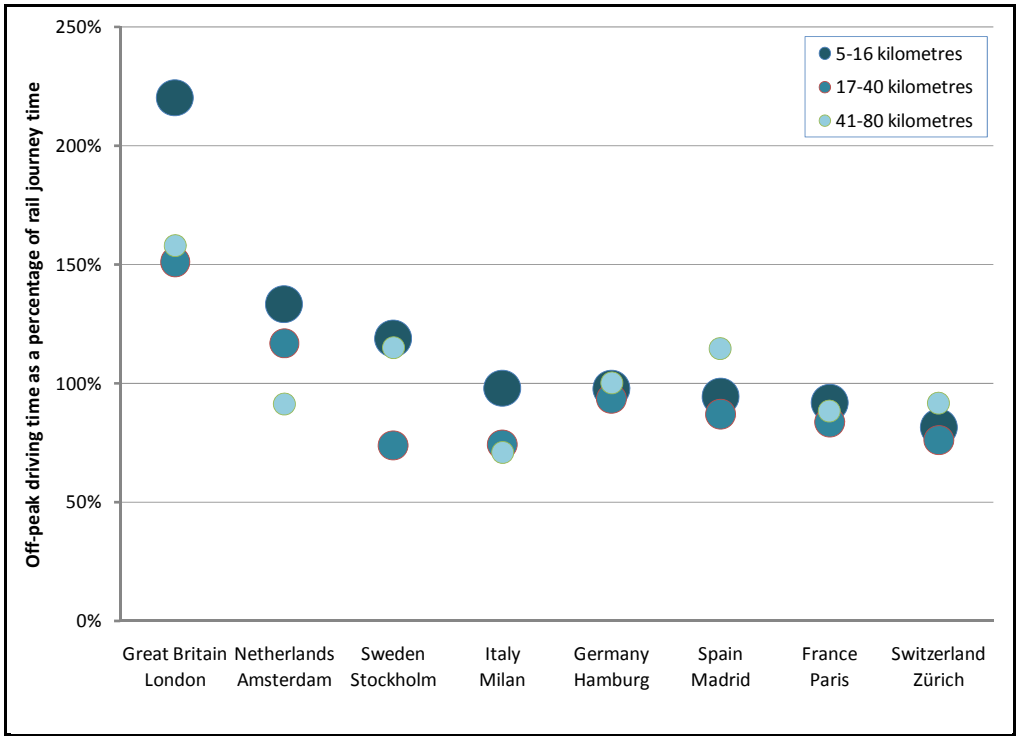
Note: small sample, illustrative of journeys to regional city centres

RAIL AND CAR JOURNEY TIMES BY REGION, OFF-PEAK, 2010



Note: small sample, illustrative of journeys to regional city centres

RAIL AND CAR JOURNEY TIMES BY COUNTRY, OFF-PEAK, 2010



Note: small sample, illustrative of journeys to principal city centres

C1.38 We found no such consistency in bus journey times, which appeared to vary widely within each city, at least partly because in many locations bus does not directly compete with rail, whether in the deregulated bus market of Great Britain outside

London or the integrated transport networks of many of the continental comparator cities.

Comparison of costs

C1.39 Examination and comparison of rail, car and bus costs proved problematic. In central London alone, bus fares are standardised, but the cost of car travel depends on whether the congestion charge is payable, the cost of parking, which is free to some commuters but for others varies widely with location, and the number of people in the car. Some commuters within London may have access to free parking at their office but not at their local station, making parking a cost of rail travel but not of car travel. In regional cities, in contrast, there is no congestion charge, and often less variation in parking costs, but bus fares are less consistent between routes and operators.

C1.40 The only consistent feature we have found in the cost comparisons is that short distance rail fares are often less than the cost of city centre parking, and in London are often less than the congestion charge. In most cases, this results in a conclusion that train is generally cheaper than car use, at least where there is a direct service between stations within walking distance of home and workplace.

APPENDIX

D

STAKEHOLDER INTERVIEWS

D1 STAKEHOLDER INTERVIEWS

D1.1 The table below lists a range of the more detailed comments made by stakeholders during the interview programme.

Group	Comments
Objectives for regulation	
Regulators	Protect passengers from abuse of monopoly power. Wider government objectives such as climate change. Support economic/employment growth. Government has chosen not to give us a duty in respect of socioeconomic disadvantage. You have the social aspects of transport and economic benefits. There are some areas where the railway is effectively the bus (and hence has a social role). PTEs have not actively engaged in rail pricing – it's only where particular investment projects can be carried out on the back of fares increases that they've tried to intervene. We are nervous about blanket fares rises because of the impact on employment and the economy. Social inclusion is important, but rail has less of a role for low income groups than bus.
Operators	Regulation should only be there when economically justified, that is, where the market isn't competitive enough. Regulation is appropriate for protecting the consumer when rail is in a dominant position, as in the London commuter market, but not elsewhere where there's no economic case. The dominant position for rail is primarily to London, but there could be some regional centres where this dominance is also the case. It is reasonable for services with a high level of subsidy to be regulated since the government has a stake in them.
Identifying abuse of monopoly power	
Regulators	Regulation hasn't allowed significant abuse, so there isn't evidence for it. It's very hard to see if there is excessive pricing, as shown by the two cases investigated by the Competition Commission.

Group	Comments
Impact of fares regulation	
Regulators	There's an overcrowding cost to Saver regulation, especially on Friday.
Operators	The current regulations create spurious demand peaks at the start of the shoulder period, so operators go through all sorts of hoops to try to smooth out demand. The spurious peaks add various costs to the operator (for example, extra staff have to be employed to manage crowds) and mean that customers have a poorer service. It makes it harder to change the fares structure, for example single leg pricing of shoulder peak fares: this also means that the fares structure, which would be easier to understand with single leg pricing, cannot be simplified. It creates anomalies at the boundary of regulated and unregulated fares. Competition law sustains anomalies because to remove them requires collusion between operators. Fares regulation is very different from one PTE area to another.
Other aspects of regulation	
Operators	There are three types of regulation: peak fares for travel in London and other conurbations, off-peak fares on longer-distance routes, and other aspects such as Railcards and the TSA. As well as regulation of the fares themselves, there's also the cumbersome structures in place which stifle innovation and change: in effect it's "process regulation". Why are there restrictions on promotional fares? These are unnecessary. Why can you only change fares twice a year? Not many other businesses have this type of restriction. There should be a relaxation of regulation of Railcard prices which would yield more revenue and wouldn't involve big price increases because it is quite an elastic market. TSA Schedule 17 imposes outdated constraints regarding booking offices (the process for changing is very "clunky") and staff employed in booking offices would be better deployed helping customers on the platform. There should be an ability to charge booking fees for different (more expensive) sales channels: this is a potential additional revenue stream. The regulations on ticket vending machines make them very customer-unfriendly: impartial retailing is a worthy concept but it's all too fussy and complicated. The requirements for interoperability hinder innovation and have, for example, prevented the roll-out of e-ticketing.

Group	Comments
Different approaches to regulation	
Regulators	Another option for regulation is less rules-based and more purposive, with an independent regulator. Rather than regulate fares there could be a quota of low priced tickets. Do you have input specifications or output targets? For example, do you specify opening hours or passenger satisfaction retailing targets? We'd be happy with an output targets approach, which could be built into franchise agreements.
Operators	The current fares structure is effectively broken, and what needs to happen is for fares levels to be reset. Making adjustments using a formula such as RPI-X takes too long and is too complicated because of the way fares baskets work.
Comprehension	
Operators	Although people aren't aware of the detail of regulation, they're reassured by its existence.
Complexity of fares	
Regulators	The fares structure is such a mess that it is not understandable and people perceive prices to be higher than they are. Time and flexibility are wrapped up together and it's not clear to the passenger how they trade one against another. There's definitely some value in simplicity, but it's difficult to quantify.
Operators	The national fares structure is within the gift of the train companies, but they've agreed to cooperate. The problem of complexity is overplayed: research shows that there is a similar level of complexity to telephony, electricity, insurance prices. We make things complicated for the passenger by showing the entire range of tickets rather than just those that are valid.
Influence of history	
Regulators	The divide between short and long distance fares structures is a throwback to differences between InterCity and Network SouthEast.
Operators	Saver regulation was invented in a different time and since then things have changed, but the railway has had to move around it. Prices on the West Coast hark back to when performance was poor and the East Coast was the flagship – the situation has reversed now but prices have been frozen. Fares levels date back to before privatisation and the world has moved on since then, so they do not reflect current market conditions.

Group	Comments
Universal provision	
Regulators	The railways could be seen as a utility, which would imply the need for universal provision (similar to government policy on Broadband or Post Office services). Not everyone has access to the railway at the moment, so it's hard to argue that it is a right. Do we wish to maintain a "walk-up" railway? If so, there are implications for providing sufficient capacity as well as for pricing.
Deregulation and the extent of competition	
Regulators	In favour of less regulation, as are most people. Deregulation of Savers is too risky because we don't know what would happen. The underlying modelling is inadequate because the PDFH doesn't adequately distinguish the shoulder peak elasticity.
Operators	Regulation of peak fares into London is hard to argue against with market shares between 40% and 50% (the kind of benchmark which triggers regulation). In other conurbations, market shares are lower so there is less justification. We can't see a justification for off-peak regulation. We're looking for as much freedom as we can get – this way we can increase fares where there's going to be a good yield and reduce them where we need to encourage growth. RPI+5% wouldn't be enough, it would just solve the problem for a year or two. Our potential for increasing fares in the off-peak is constrained by competition from car, coach and air, and because the leisure market is price-elastic. Hence our focus has been on introducing cheaper advance purchase fares. Outside London we are competing with bus and not travelling. On some routes to London we do have competition from other rail operators. Inside London we compete with bus and Underground, In PTE areas the main competition is from bus, whose fares are not regulated and in some cases are higher than the equivalent rail fares, even though rail is a premium product. No train company wants to put itself in a situation where its fares are rising faster than anyone else's because of the reputational risk – this is a natural regulation.

Group	Comments
Effect of deregulation and single leg pricing	
Regulators	If there was Saver deregulation the Saver price would move much closer to the Anytime price. You basically have a situation where you have rail monopolies. The way that some of the train companies have taken the old Saver fare and effectively introduced a new Saver fare above it shows that they're out to maximise every penny they can. If you're encouraged to buy an Advance Purchase out you still need some flexibility back, so why not have single leg pricing? There would have to be regulatory element because you have to choose a price for the regulated level of the single.
Operators	Longer distance operators would move to a single fare structure: anytime single, off-peak single and advance single. This would have to be introduced gradually, though. The underlying off-peak rate per mile would increase, though by different amounts on different routes. On flows that are growing prices would rise, on those which needed some support they would fall. We would introduce a shoulder peak fare and aim to smooth demand, we wouldn't aim to increase overall fares levels: there would be some winners and some losers, but less overcrowding. On short distance flows, elasticities are lower than DfT believes.
Spreading the peak	
Regulators	A shoulder peak fare would make sense. The "cliff face" (between peak and off-peak prices) has been caused by the operators "banging up the Anytime fare to the point of ridicule". Some operators already have two tiers of off-peak fare (Saver and SuperSaver), giving three pricing points. This shows they have the flexibility to introduce shoulder peak fare. The peak period is largely fixed because people don't have flexibility in when they work – an exception is the civil service. The problem in PTE areas has been that increases in off-peak fares have meant the peak differential is less and peak travel is encouraged. Operators don't appear to recognise crowding, as they don't have performance targets for it. The ability to manage demand through price is constrained in PTE areas where there are area-wide tickets. This means crowding can vary greatly from one route to another.
Operators	It requires quite high fares differentials (30%) and so a degree of courage. Experience of early bird type tickets is "patchy". In the medium/long term we could see a change in working patterns. It's not something the rail industry can crack on its own because you need more flexible working.

Group	Comments
Role of franchise agreements	
Regulators	There's a huge difference between franchises and operators which are in revenue support and those that aren't. In most PTE areas (Centro excepted) the PTE is a co-signatory in the franchise agreements and so has a say in whether fares go up. Via ad-hoc agreements they can then use some of the additional revenue to invest.
Operators	The best way of implementing deregulation of off-peak fares is through franchise agreements. This way you don't have to have a "one size fits all" solution. During the franchise bidding process different bidders should be able to come forward with different fares and costs proposals. Fares need to be adjusted at the same time across the network because of overlaps and shared routes. However, you could divide the network into London and South East south of the Thames, London and South East north of the Thames, long distance, and regional. The franchise structure causes new ideas to be implemented piecemeal: new ticketing systems and methods of ticketing don't fit this approach well.
Revenue generation	
Operators	The ability to raise revenue by increasing fares depends on the competitive position and the view of elasticities. While demand is seen to be fairly inelastic in the peak, in the off-peak it is (perceived to be) quite variable, and increasing fares won't necessarily increase revenue. Our approach to achieving revenue growth is via volume growth and demand management, not raising fares.
Anomalies	
Regulators	The London Travelcard creates a "massive" distortion and is a constraint on fare setting.
Operators	Any short distance season ticket fares are nearly five times the daily fare whereas at longer distances they are only two to three times.

Group	Comments
Costs	
Regulators	It's very difficult to identify the cost of individual flows. Some routes are apparently much more difficult to run than others. Fares regulation could be used to put pressure on operators and Network Rail to reduce costs, as Ofwat does for water. Costs are higher than they should be because of missed synergies between renewals and enhancements. The way the industry is set up, the PTEs have very little control over costs, particularly for stations.
Operators	For many London and South East operators the cost base is driven entirely by have a fleet big enough to cope with the peaks. There's a hidden cost behind having to offer interavailable tickets because it constrains commerciality (though it may still be right to do).
Smartcards	
Regulators	Smartcards work in urban areas, but there might be a problem with the intercity network. You'd have to have a step change in information, but the idea of having flexible but transparent pricing is worth exploring. The PTEs are extremely active on smartcards and there are very few regulatory obstacles.
Operators	Smartcards can't (easily) be introduced now because of the existing regulations and fares basket approach. It would require quite a different fares structure. It raises a whole series of questions that need to be resolved. In conurbations, smartcards enable more granular pricing. We are moving towards Smartcards and eventually they will replace season tickets. This will radically change the shape of how people travel, with people varying the hours they travel. Smartcards allow you to have a fares structure which helps spread the peak.
Advance purchase tickets	
Regulators	It's always attractive to have an advance purchase fare because the leisure market is quite price elastic and it's a good segmenting device. There should be clearer rules on delayed trains. We're nervous of the consistent noises from the industry that long distance travel should be booked ahead- "Stop enjoying yourself, it's time to catch the train!" - There's a slogan for you! A reasonably-priced walk up fare should be protected. They devalue the frequency of service. It should be easier to upgrade or change your ticket if plans change.
Operators	It's really "walk up and wait" because there's so little spare capacity now.

Group	Comments
Ticket retailing	
Regulators	There's a lack of clarity about restrictions on the ticket vending machines (TVMs) and on the internet. You often hear passengers asking the train manager nervously "Is this ticket valid?". We have this twelve sales an hour threshold, so over time more and more stations will fall below that threshold and won't require booking offices. The problem with doing away with booking offices is that TVMs don't do what a clerk does.
Operators	Booking offices use is falling In the Netherlands you pay more for using a booking office. This is something we looked at but didn't propose because DfT were negative about the idea. The fact is that sales channels are changing but regulations haven't caught up with the fact.
Link between quality and price	
Regulators	The link between quality and price is very weak. The current fares regulation prevents a link between quality and fare level. The pre-2003 formula didn't work because the time-lag was too great. It was thrown out without trying to fix it. The drivers for value for money are price, punctuality, overcrowding and information at times of disruption. If a company is doing poorly on these and putting up prices that's not right. The operator may not have complete control over these things but they need to manage the supply chain.
Operators	There should be more variation in the formula to take account of quality, and investment. You could use a basket of measures which includes the NPS and investment, though that would be difficult and hard to communicate. Fares should only be linked to quality if we (operators) have control over the quality of service. Fares should reflect investment, but this needs to be done properly (not like Southeastern when fares on the whole franchise have been increased, not just for those benefitting). Fares are not the right mechanism for dealing with performance: there needs to be a separate mechanism for providing a rebate for poor performance. In some PTE areas there has been an explicit trade-off between investment and price, with big fares rises coupled with investment.
Summary of trends	
Operators	An increasing proportion of Advance fares. A move to smarter ticketing technologies such as smartcard and e-ticketing. An increase in part-time work, and therefore less than five days a week commuting. A move to single leg pricing.

APPENDIX

E

ECONOMIC PRINCIPLES AND THEIR PRACTICAL APPLICATION

E1 ECONOMIC PRINCIPLES AND THEIR PRACTICAL APPLICATION

Objectives

E1.1 In commissioning the study, the rail value for money team identified a wide range of issues arising from the current approach to fare setting and fares regulation on the railways. A number of these are symptomatic of an economically inefficient fares structure, whereby passengers receive incorrect signals about the costs of travel of different rail services. For example:

- Many peak fares are set at a level that leads to excess demand in the form of crowding. In particular season tickets, which are available at a discount to the full fare for travel during peak hours, allow free additional travel at times when capacity is constrained. This has resulted in publicly funded investment in additional capacity on some routes, at least some of which might have been avoided under a different fare structure.
- Similarly, some off-peak fares are priced in a way that fails to take account of capacity constraints, notably in the shoulder peak. More specifically, the availability of regulated Off-Peak Return (formerly Saver) fares that are valid in the shoulder peak results in high levels of demand for travel on the first train available after the end of the peak.
- At the same time, some unregulated off-peak fares may be too high, leading to underutilised capacity at certain times of the day.

E1.2 The implication is that there is considerable scope for raising some peak fares and reducing off-peak fares, thereby raising revenue in the peak and shifting some demand to times of the day when capacity is more readily available. In the long run, this should allow a given demand to be accommodated within lower levels of capacity provision, thereby reducing costs. This Appendix examines how far economic theory provides support for such an approach and identifies the practical issues surrounding the application of economic principles to fares regulation.

Organisation of this Appendix

E1.3 The remainder of this Appendix is organised as follows:

- Section E2 sets out the standard economic theory of marginal cost and peak load pricing as a starting point for devising efficient fare structures for rail services. It also identifies a number of issues that must be addressed in defining marginal cost, highlighting the difficulties of applying theoretical approaches and proposing a practical framework to guide future fares regulation.
- Section E3 describes a number of economic arguments for departing from marginal cost pricing, in particular the case for Ramsey pricing as a means of maximising economic welfare subject to a revenue constraint. It also sets out the arguments for modifying the marginal cost pricing rule to achieve broader objectives.
- Section E4 discusses apparent shortcomings in the current regulation and structure of fares in the light of the economic arguments presented in earlier sections.
- Section E5 reviews models attributing rail costs to services and the difficulties associated with using them to base fares on marginal costs in practice.

E2 MARGINAL COST PRICING: THEORY AND PRACTICE

Marginal cost and peak load pricing

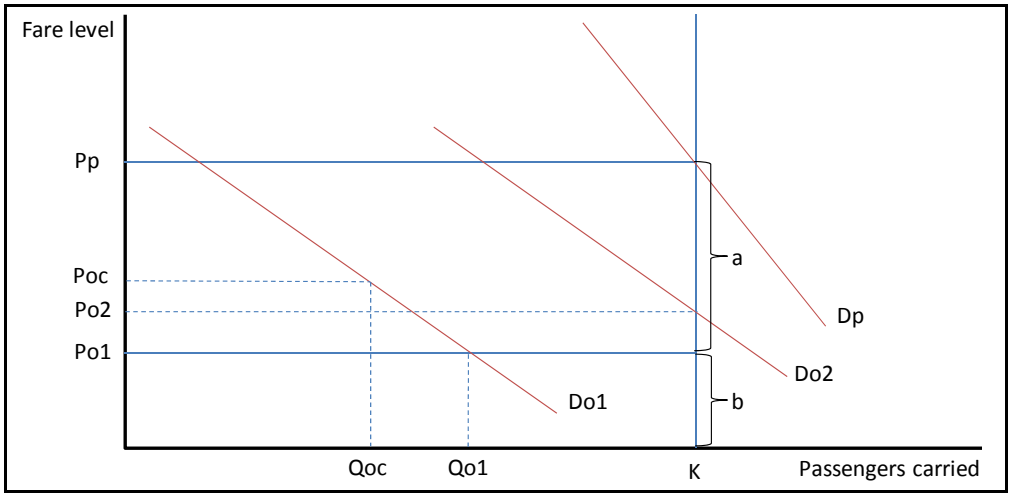
E2.1 According to economic theory, economic efficiency requires the price of a good or service to be set equal to marginal cost. In these circumstances, the value of the last unit of output supplied, as indicated by the price that the marginal consumer is prepared to pay for it, is just equal to the cost of producing it, and economic welfare (defined as the sum of consumer and producer surplus) is maximised. In principle, the same condition for the optimisation of economic welfare applies to rail as to any other services.

E2.2 The potential for price to diverge from marginal cost, particularly in markets where goods or service providers enjoy market power, is one of the main economic reasons for regulating them. In the absence of regulation, such providers tend to raise prices above marginal cost in order to maximise profits, reducing economic welfare relative to the optimum. While market power is difficult to define and measure, it is generally a feature of markets where consumers have a limited or even no choice of supplier. This is often the case in rail markets, such as on commuter services into London for which there are few if any viable alternatives for most passengers. Train operators in these and other markets are, however, constrained in their ability to exploit market power through mechanisms for regulating fares included in franchise agreements. In practice such mechanisms do not ensure equality of price and marginal cost, but they are nevertheless intended to increase economic efficiency relative to the outcome under unregulated, commercial fare setting.

E2.3 The application of marginal cost pricing to the rail sector is, however, challenging, because the rail product is defined according to a number of dimensions including, inter alia, the journey origin and destination, the time of travel, the permitted level of flexibility surrounding the time of travel and the level of service quality. We note in the main report that there are, at any one time, around 100 million rail fares. The marginal cost of rail services can therefore vary considerably across different products and any fares structure closely reflecting underlying marginal costs is likely to be complex. Such complexity may be difficult for passengers to understand and, depending on the available technology, difficult for train operators to administer.

E2.4 The simplest illustration of marginal cost pricing in rail abstracts from this complexity and focuses on the distinction between peak and off-peak services. It envisages a situation in which rail services can be provided to meet demand at a constant cost per unit of capacity and constant running cost, “a” and “b” respectively in the Figure overleaf. The level of capacity provided, K, is determined by the level of peak demand “Dp”, with peak services priced to cover the marginal capacity and running costs. With the peak fare Pp equal to “a+b”, capacity is just sufficient to meet demand and every peak train is full.

MARGINAL COST PRICING IN RAILWAYS



Source: Steer Davies Gleave analysis

E2.5 The efficient level for the off-peak fare depends on the level of off-peak demand, with the demand curves "Do1" and "Do2" in the diagram representing two possibilities. In the case of "Do1", it is appropriate to set the off-peak fare Po1 equal to the running cost "b" since once the level of capacity has been determined by peak requirements the marginal cost is simply the cost of running trains during the off-peak. At this price, the level of demand Qo1 can be fully accommodated within the available capacity. Moreover, any attempt to raise the off-peak fare in order to ensure that off-peak passengers make a contribution to capacity costs, say to Poc, results in sub-optimal use of capacity Qoc. A lower price would result in higher capacity utilisation while covering the full cost of the additional service at the margin.

E2.6 The off-peak pricing decision is more complex in the case of "Do2". In these circumstances, an off-peak fare equivalent to the marginal running cost results in a level of off-peak demand that exceeds the available capacity. Excess demand is likely to take the form of crowding on trains and/or turning away passengers at the station, both of which are sub-optimal in terms of economic welfare. Hence, with levels of off-peak demand given by "Do2", it is appropriate to price above the marginal running cost and require off-peak passengers to contribute to capacity costs by paying a fare equal to Po2. In general, the optimal structure of fares from an economic welfare perspective can be determined by deriving a weighted demand curve comprising both peak and off-peak demand, with the weights set according to the number of peak and off-peak hours during an entire operating day.

E2.7 A possible application of this framework involves a hierarchy of cost causation, with:

- Peak demand (Dp) "causing" infrastructure and rolling stock capital costs as well as operating expenditure.
- Shoulder peak demand (Do2) "causing" rolling stock capital costs and operating expenditure.
- Off-peak demand (Do1) "causing" operating expenditure alone.

E2.8 While, as discussed further below, this approach is perhaps overly simplistic, it highlights the problem underlying the crowding due to the availability of regulated off-peak fares immediately after the end of the peak period. Passengers travelling on these fares are not making an appropriate contribution to capacity costs, notwithstanding that there is excess demand for available capacity in the shoulder peak.

Defining marginal cost in practice

The nature of railway investment

E2.9 The simplified illustration above assumes that capacity can be expanded incrementally at a constant cost per unit of output, and that running costs can be similarly determined incrementally according to the number of passengers carried. In these circumstances it is possible to match capacity to demand precisely, clearly an unrealistic assumption in the case of railways and many other industries.

E2.10 Real rail investment differs from this representation in two important respects:

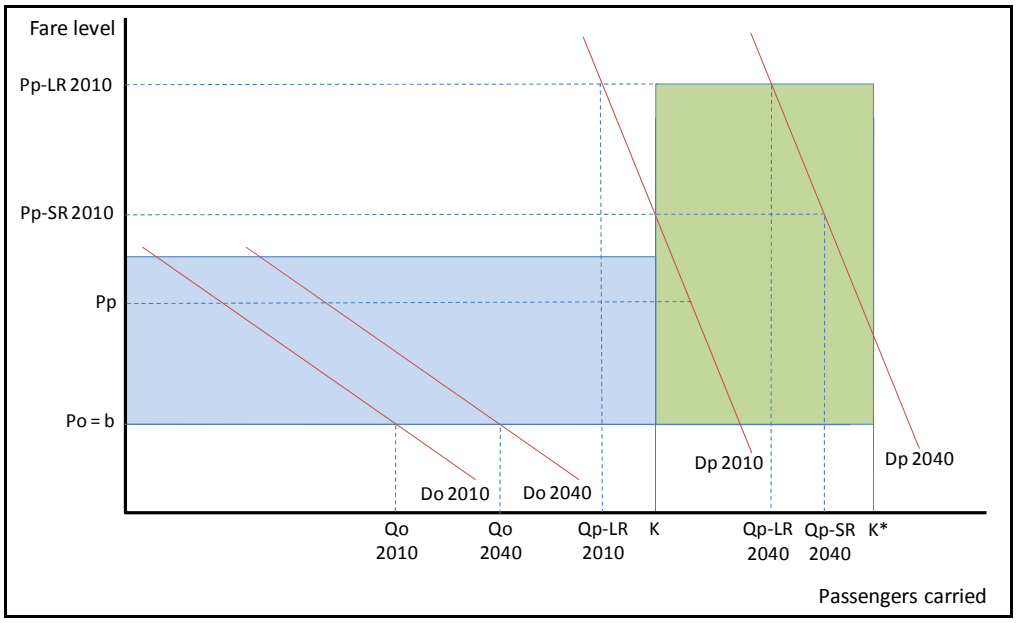
- While it is possible to expand capacity by different amounts according to the type of investment (for example, an additional vehicle, an additional train or a reconfigured junction allowing more train paths), such expansion is nevertheless typically "lumpy", potentially resulting in excess capacity for a period after the delivery of an investment project. Indeed, efficient planning often requires that the level of expansion is determined with a view to accommodating expected changes in the level of service driven by projected increases in demand. In these circumstances, it will not be possible, period by period, to align capacity precisely with demand.
- The costs of railway investment are usually "sunk" since they cannot be avoided or reversed once the investment project has been delivered. This is because railway assets usually have few if any alternative uses, particularly in the case of infrastructure. If infrastructure capacity is expanded in order to accommodate additional demand which fails to materialise, it is not possible to redeploy the infrastructure assets to meet demand in another market (except possibly by scrapping them, which will yield little revenue compared to the original cost of the investment). Moreover, while there is clearly more scope for redeployment of rolling stock, this is also limited by technical constraints and the fact that trains are designed to reflect the characteristics of the different markets that they serve.

Short run and long run marginal cost pricing

E2.11 These characteristics of railway investment, coupled with the difficulties of forecasting demand over the life of railway assets, mean that the capacity provided is rarely optimal in an economic sense. At any point in time, services are likely to be either underutilised or capacity-constrained and subject to crowding. Similar outcomes are observed in other industries that are also subject to lumpy and sunk investment, such as gas and electricity transmission and supply, and have led to debate between economists over a number of years concerning the appropriate pricing rule to apply in these circumstances.

E2.12 More particularly, the debate has focused on whether to set prices equal to Short Run Marginal Cost (SRMC) or Long Run Marginal Cost (LRMC) and can be illustrated with reference to the diagram below[12].

SRMC AND LRMC PRICING



Source: Steer Davies Gleave analysis

E2.13 The diagram depicts a railway service capable of carrying up to K passengers over a defined period (peak or off-peak) in 2010. As in the previous case, running costs are assumed to be "b" per unit of output. Annualised capacity costs assumed to have been sunk by 2010 are equal to the area of the blue shaded rectangle. Current peak and off-peak fares are Pp and Po respectively, both set according to historical policy criteria. Peak and off-peak demand in 2010 is represented by the demand curves Dp 2010 and Do 2010 respectively. However, demand in both the peak and off-peak is expected to grow steadily to the levels shown by Dp 2040 and Do 2040 by the year 2040[13].

E2.14 Planners and funders are therefore considering investment to increase capacity to K*, an increment judged to be efficient in engineering terms given the characteristics of the route in question. The associated incremental capacity costs (again assumed to be annualised) are equivalent to the area of the green shaded rectangle. The costs of operating the new capacity are assumed to remain the same at "b" per unit of output.

E2.15 As already discussed, in the case of passengers using off-peak services there is an economic welfare case for setting fares well below capacity costs to cover only the marginal costs of carrying an additional passenger incurred in the short term. In setting an economically efficient level of fares, the key consideration is which costs are "avoidable" at the margin in the short run (i.e. what is the level of

[12] For a discussion of the various contributions to this debate, see Roland Andersson and Mats Bohman, *Short- and long-run marginal cost pricing: on their alleged equivalence*, Energy Economics, October 1985.

[13] 2010 and 2040 are arbitrary dates chosen for the purposes of illustration, recognising that the economic life of railway assets tends to be at least 30 years.

SRMC). Any attempt to cover a proportion of sunk costs simply leads to sub-optimal use of capacity, since it is then possible to identify passengers who will not travel at the prevailing fare but are prepared to do so at a fare that covers the additional cost of carrying them[14]. Off-peak fares in 2010 are therefore set at Po equal to b, and Qo 2010 passengers are carried on the off-peak service. Moreover, while demand increases to 2040, the number of passengers wishing to travel at a fare of Po in 2040 can be easily accommodated within the capacity available in 2010 and there is therefore no case for changing the fare.

E2.16 Determining the appropriate pricing rule for peak services is more problematic. In 2010 capacity is constrained at the prevailing peak fare Pp and there is excess demand. This could mean allocating capacity on a "first come first served" basis, as is the case for many rail services at present, resulting in passengers being left behind on the platform even though they value the journey opportunity more highly than others able to travel. In the short run, economic efficiency requires that capacity is allocated to those passengers placing the highest value on the ability to travel. This means that fares should be set at a level at which available capacity is just sufficient to meet demand, Pp-SR 2010 in the diagram. In economic terms, this can be described as SRMC pricing since it results in optimal use of availability capacity in the short run. In the example illustrated in the second Figure above, pricing on this basis also allows recovery of historic capacity costs, although in practice such an outcome is certainly not guaranteed[15].

E2.17 However, once the new investment has been made SRMC pricing implies a very different level of fares. After completion of the investment project the capacity costs are sunk and cannot be avoided. Short term economic efficiency therefore requires that peak fares fall to the off-peak level Po, since this leads to an optimum use of the capacity available post investment (capacity is no longer constrained at this fare level). There is only a case for raising fares once demand has grown to the point where capacity is again constrained at the fare level Po (represented by a shift in the demand curve towards Dp 2040). This outcome is a direct result of the inability to align capacity with demand at a given price and is clearly problematic in policy terms. In particular, it is likely to be financially unsustainable as passengers make no contribution to the costs of enhancing the service other than recovery of the incremental running costs. In addition, it implies very substantial changes in fares that could undermine both train operator and passenger planning.

E2.18 Given these difficulties, setting the peak fare equal to LRMC, Pp-LR 2010 in the diagram, has a number of attractions. As demand grows, passengers make a substantial contribution to the recovery of capital costs (and may eventually recover the total annual cost, if demand continues to grow steadily beyond 2040).

[14] In practice it will not be possible to attribute costs to an individual passenger (other than the cost of issuing a ticket), but collectively passengers using a service could be expected to cover the costs of the additional power used in running it and the costs of the train crew.

[15] In the second Figure, the short term market clearing fare in the peak, Pp, generates revenues that exceed sunk capacity costs given by the area of the blue shaded rectangle. Whether this outcome arises in practice depends on the position of the peak demand curve in relation to the current capacity constraint (given by the vertical line at K). Nevertheless, pricing to clear the market in the presence of capacity constraints can generally be expected make some contribution to the recovery of capacity costs.

Train operators and passengers also benefit from a stable fare level albeit, from a passenger perspective, less affordable than previously. The outcome is therefore more sustainable and predictable in financial terms, assuming demand growth can be projected with reasonable confidence.

E2.19 In addition, LRMC pricing may have a number of advantages arising from the dynamics of rail markets. Such dynamics are not captured by the relatively static analysis presented in the diagram, which essentially compares outcomes at two points in time, rather than explaining how passenger behaviour might evolve in response to different fare levels. More specifically, within a dynamic framework LRMC pricing is considered to bring two important benefits:

- First, passengers willing to pay a fare equal to LRMC are able to signal to planners and funders that the value they place on capacity at the margin is at least equal to, and may exceed, the cost of providing it.
- Second, and using the same communication mechanism, planners and funders are able to signal the cost of additional capacity to passengers, in turn enabling the latter to take this into account in their travel and broader planning decisions. This information could, for example, be factored into decisions about how journeys to work are made and even where to live.

E2.20 In principle, price signalling of this kind can bring significant benefits over the long term in the form of savings in railway costs. For example, it might encourage more people to live near to rail routes requiring less investment for expansion than others (either because capacity is currently less constrained or because the route characteristics enable cheaper options for capacity expansion to be pursued). More generally, setting fares at LRMC could actually reduce growth in rail demand by encouraging passengers to investigate possible alternatives to rail travel (for example, increasing home working rather than daily commuting). Required capacity increases, and hence costs, might therefore be significantly lower than would otherwise be the case.

E2.21 At the same time, LRMC pricing is also subject to a number of drawbacks that would make it difficult to implement. These largely derive from the fact that the concept is difficult to define and apply in practice, as our review of previous exercises to investigate railway costs described in Section E5 below demonstrates. Indeed, some economists have argued that LRMC is not a meaningful concept in the case of industries characterised by lumpy investment and sunk costs, and that the supposed dynamic benefits of LRMC pricing are largely illusory.

E2.22 Taking the argument that passengers paying LRMC-based fares are signalling the value they place on investment, it is clear that at any point in time they are not willing or able to signal the value placed on a major enhancement over the long term. In the second Figure above, passengers' willingness to pay for the planned enhancement still does not exceed the annualised cost by 2040 and, depending on the extent of further demand growth, may never exceed it. In fact, because of the lumpiness of the investment, it is not possible to identify LRMC in a strict sense and it must be approximated by average incremental cost. Pricing at this level in 2010 clearly does little to signal the value placed on additional capacity by passengers in later years.

E2.23 In responding to similar criticisms of LRMC pricing as a basis for setting charges in other industries, some economists have argued that consumers are sometimes able to signal their willingness to pay over an extended period[16]. For example, in the electricity industry, industrial and commercial users can enter into long term contracts, effectively committing to take supplies at defined tariffs over a number of years. In addition, domestic users invest in electrical appliances of various kinds with lives of five years or more that also imply a commitment to purchase electricity over the long term, at least within a reasonable range of tariffs. However, there is no direct analogy here with rail travel. Even though some rail passengers invest in season tickets, these are only available for up to one year and can be wholly or partly refunded during the year if no longer needed if, for example, the passenger moves, retires or becomes unemployed. There is neither a means by which passengers can commit to travelling by rail over several years nor, probably, a large number of passengers willing to make such a commitment.

E2.24 The possible advantages in signalling to passengers, rather than to planners and funders, are potentially substantial if the overall structure of fares is fully reflective of LRMC route-by-route and period-by-period. Passengers would then be provided with information that could be factored into decisions about whether to use rail services for different journeys (taking account, for example, of opportunities for home working as mentioned above) and if so which services to use (decisions that could in turn influence other plans such as where to buy a house). However, calculating LRMC at a sufficient level of geographical disaggregation would be demanding and, on the basis of experience from the previous studies summarised in Section E5, is likely to prove impractical.

E2.25 In response to concerns about the complexity of a geographical disaggregation of this kind, it could be argued that there is merit in signalling the general costs of capacity expansion, calculated by reference to a broad averaging of indicative schemes across the network. This would also incentivise passengers to consider alternatives to rail and could therefore result in significant cost savings over the long term. At the same time, there is a risk that this approach would lead to inefficient outcomes, for example by understating the costs of expanding capacity on routes that in fact require substantial investment in order to relieve existing constraints. Indeed, any approach based on averaging, by definition, tends to run counter to the principles and benefits of marginal cost pricing. In addition, simply encouraging passengers to consider rail alternatives could have perverse impacts in some markets, for example an increase in car traffic leading to higher levels of congestion and greater emissions (an issue considered further in Section E3), even where unused rail capacity is available.

E2.26 Further, attempts to price at LRMC could be seen as perverse in a number of ways by passengers and other stakeholders. Returning to the second Figure above, consider the effects of an increase in fare levels from Pp to Pp-LR 2010, which results in underutilisation of capacity in 2010:

- For passengers who continue to use the service, the fare reflects the costs of an enhancement scheme from which they are not currently benefitting, and from

[16] See, for example, Dennis L Weisman, *A note on first-best marginal cost measures in public enterprise*, Energy Economics, October 1991.

which they may never benefit if the higher fare results in a significant reduction in demand growth such that the investment is no longer necessary.

- For passengers who no longer travel because they are priced off, the new fare is particularly difficult to justify since there is lower a fare level, Pp-SR 2010, at which they would be prepared to travel that covers running costs and makes a significant contribution to the recovery of historic capacity costs.
- More generally, the underutilisation of capacity in the short term under LRMC pricing is a major disadvantage of the approach.

E2.27 Finally, we note that the assumption underpinning the second Figure above, that LRMC is above the current level of fares, is only illustrative. In practice a move to LRMC pricing could result in a reduction in peak fares in some markets. This could be the case, for example, where capacity can be expanded substantially at relatively low cost, such as by reconfiguring the internal layout of existing rolling stock. In these circumstances LRMC pricing will tend both to exacerbate any existing crowding problems and to undermine financial sustainability.

A modified approach

E2.28 The difficulties in applying LRMC pricing have led some economists to argue that it is of no practical value in determining how prices for utilities and public services should be set. For example Andersson and Bohman, in the work referred to in paragraph E2.12, conclude that:

"… LRMC pricing as described in theory boils down to nothing more than average cost pricing in practice. We believe that it would be wise to dispense with this concept altogether and rely on pricing based on SRMC with due consideration of budget constraints and other second best restrictions."

E2.29 In our opinion, their observations about the problems in translating the theory of LRMC pricing into practice are well-founded. At the same time, the statement raises the question of how an approach based on SRMC can be adapted to take account of budget constraints, particularly given the implications of SRMC pricing for financial sustainability identified in paragraph E2.17. Against the background of current public sector funding constraints, pricing at SRMC in all circumstances appears incompatible with financial sustainability. This issue is also considered further in Section E3, which discusses the concept of Ramsey pricing as a means of raising revenue while preserving economic efficiency as far as possible. Here, we note that the need to ensure financial sustainability also suggests a modification of the SRMC approach with the aim of securing at least some of the benefits normally attributed to pricing based on LRMC.

E2.30 In our view, this would involve an initial rebalancing of fare levels to reflect the availability of capacity relative to demand both through the day and route-by-route, consistent with SRMC pricing. However, we suggest that peak fares initially set with the aim of clearing the market in the short term should then be maintained, notwithstanding the delivery of committed enhancement projects resulting in excess capacity over the short to medium term. In terms of the example shown in the second Figure above, the peak fare would be maintained at Pp-SR 2010 even after the incremental capacity costs had been sunk, generating significant year-by-year increases in revenue as the demand curve shifted to the

right. If capacity again became constrained, the fare could be allowed to rise further to clear the market, although this would be avoided if further enhancements were delivered in the meantime.

E2.31 Such an approach, while not fully consistent with principles of economic efficiency, has a number of advantages:

- It is easier to apply than LRMC pricing, since it does not require knowledge of the costs of enhancing capacity on a route-by-route basis. Efficient pricing in the peak will generally only require an understanding of historic volumes and fares, demand elasticities and available capacity.
- The immediate impact of rebalancing peak and off-peak fares would be a more efficient use of the capacity currently available. It would also be likely to raise revenue, since some peak fares could be expected to increase substantially, although additional peak revenue could be offset to some degree by lower off-peak revenue.
- Although maintaining peak fares over an extended period, even after capacity increments have been delivered, results in suboptimal capacity utilisation, it will ensure that passengers using peak services make a contribution to the recovery of capacity costs. This could have some of the beneficial signalling effects to which we refer above.
- While passengers will not welcome higher peak fares, they will generally understand that capacity requirements and hence costs are largely determined by peak demand. They will also generally recognise the need for peak users to make a contribution to capacity costs. As noted in paragraph E2.26, the rationale for LRMC pricing would be difficult to explain and justify.

E2.32 The implications of the approach for fares regulation are considered further in Section E4, where the consideration of possible applications has informed a number of the options for reform of the structure and regulation of fares described in Chapters 4 and 1 of the main report.

Marginal costs from the perspective of a train operator

E2.33 Whatever the appropriate theoretical approach, the application of marginal cost pricing to Great Britain's railways is further complicated by the structure of the industry and the way in which franchise obligations are specified. In particular, the detailed specification of train services within franchise contracts leaves train operators with very little discretion to vary service levels in response to changing market conditions. Faced with these constraints, operators will regard the majority of franchise costs as fixed, with very few costs varying at the margin in response to changes in output, as measured by the volume of passengers carried. By contrast, from a whole industry or societal perspective, a greater proportion of costs can vary in response to an increase or reduction in demand, and the level of marginal cost should be defined accordingly. Hence, under the current industry structure, the definition of marginal cost depends critically on the perspective of the particular party making a pricing or investment decision.

E2.34 We note that this situation may change to some degree if, as expected, future government policy in relation to franchising allows train operators greater freedom to vary service levels in response to commercial incentives. Depending on the

flexibility permitted under new franchise terms, operators might be able to increase or decrease a wider range of costs by adding or removing services. In principle this should result in operators taking a different view of marginal cost, although it is not yet clear how much control over service schedules they will have in practice.

E2.35 A train operator's understanding of marginal cost is also conditioned by the fact that infrastructure costs are initially borne by Network Rail and remunerated by a combination of track and station access charges and direct grant from the government. The Office of Rail Regulation (ORR) has modified the structure of access charges substantially in recent years in an attempt to make them more reflective of underlying costs, such as track damage and performance impacts. However, given the high proportion of access charge revenue accounted for by the fixed charge, and the importance of the direct grant in Network Rail's overall funding, train operators' perceptions of marginal infrastructure costs are not completely aligned with the underlying structure of industry costs in the long run. The application of provisions in Schedule 9 of the franchise agreements, whereby operators receive compensation for changes in regulated access charges, also reduces the impact of efforts to make charges more cost reflective, at least in the short term (that is, prior to franchise renewal).

E2.36 Whether these issues are important depends on the future objectives of fares policy and regulation. More specifically, if the aim is to encourage train operators to implement a structure of fares that reflects the underlying costs of different routes, conditions of travel and service quality, it is important that they have an understanding of how all industry costs vary with service levels and other measures of output. This will be particularly important if government policy aims to give train operators a greater say in investment decisions. In the absence of a proper understanding of marginal costs, operators will not assess investment opportunities effectively, and it will prove difficult to move away from the current approach to rail sector enhancement based almost entirely on coordinated industry planning and public sector appraisal.

E3 DEPARTING FROM MARGINAL COST PRICING

Ramsey pricing

E3.1 In Section E2 above we noted that economically efficient pricing may result in fare levels that do not allow the recovery of the full costs of service provision. This occurs where capacity costs are largely or entirely sunk and capacity provision exceeds demand over a wide range of fare levels. In these circumstances the utilisation of capacity can be optimised by setting fares equal to the short run marginal or avoidable cost of the service. While we have suggested a modification to this approach, in general it will not be possible to recover the full costs of an enhancement from the point at which it is delivered.

E3.2 In addition, economic theory demonstrates that marginal cost pricing may result in a failure to recover total costs in other circumstances, specifically where average unit costs fall throughout the relevant range of output and marginal cost is therefore always below average cost. These cost conditions prevail in industries

that are subject to economies of scale, which, according to evidence in the academic literature, are a feature of at least some aspects of the rail sector[17].

E3.3 Regardless of why marginal cost pricing leads to less than full cost recovery, it is clear that such a situation is not sustainable in the absence of an additional revenue source, for example income from other activities or some form of public subsidy. However, supplementary income sources in the rail sector tend to be limited (although important) and, given the major public funding constraints prevailing at present, it is anyway important to consider how the existing rail subsidy might be reduced. The economic literature on optimal departures from marginal cost pricing is therefore particularly relevant.

E3.4 The rule for setting optimal prices that maximise economic welfare while allowing a required level of revenue to be raised is well established. The so-called Ramsey pricing rule[18], derived from an optimisation problem in which welfare is maximised subject to a revenue constraint, states that the proportional mark-up of prices in a given market should be inversely related to the elasticity of demand in that market. Mathematically, the price P in market j should be set such that:

$$\frac{Pj - MCj}{Pj} = \left(\frac{1+\gamma}{\gamma}\right)\left(\frac{1}{-Ej}\right)$$

E3.5 Intuitively, the rule specifies the best way of raising revenue while departing as little as possible from the outcome that would result under pure marginal cost pricing. The rule permits the service provider to move away from this outcome to the extent necessary to raise the required revenue and no more. This means setting a higher proportional mark-up over marginal cost, (Pj-MCj)/MCj, in markets where demand is relatively inelastic (the value of Ej is relatively low), since the resulting level of demand will be closer to the theoretical optimum than if prices were set higher in markets characterised by relatively elastic demand.

E3.6 The Ramsey pricing rule is similar to the rule that determines the prices charged by an unregulated, profit maximising monopolist, but differs in that the inverse of the elasticity is multiplied by a factor, (1+γ)/γ, reflecting the revenue constraint being imposed. In effect, the rule harnesses the efficiency with which monopolists raise revenue, but constrains it in order to achieve an economically desirable outcome. In principle, it would be possible to design a constraint to achieve any particular level of revenue, for example in order to secure a given balance between tax and fare revenue in covering the costs of the railway.

E3.7 Moreover, because Ramsey pricing aligns well with the profit maximising behaviour of service providers, it has important advantages in terms of the administration of the regulatory process. At first sight it appears that, in order to impose Ramsey prices, a regulator would need to have access to detailed information on elasticities and marginal costs in a large number of markets. The resulting information problem could be expected to be particularly daunting in the rail sector, given the large number of rail products, defined by reference to different characteristics, mentioned in paragraph E2.3.

[17] Various studies have found evidence of economies of scale in the provision of rail infrastructure but the evidence is less clear in the case of rail operations.

[18] The rule was first specified by F Ramsey in *A Contribution to the Theory of Taxation*, Economic Journal, 1927.

E3.8 However, it is possible to demonstrate that, under certain assumptions, a profit maximising service provider facing tariff basket price regulation of the kind applied to rail operators will set prices equivalent to the optimum levels defined by the Ramsey pricing rule. While, in practice, no fares structure is likely to replicate a theoretical optimum precisely, the fact that operators will tend to approximate it when subject to a system of price regulation that can be clearly defined greatly simplifies the regulatory task.

E3.9 This suggests that the framework of fares regulation should set limits on overall revenue through the tariff basket rather than on individual fares. This conclusion is supported by the results of a study originally undertaken on behalf of the Strategic Rail Authority by the Institute for Transport Studies, University of Leeds, reviewed in our literature review (Appendix A, paragraphs A1.70 to A1.75). Following an economic evaluation of different fare regulation options, the study found that the imposition of a 6% maximum increase on individual fares within the fares basket (under the regulatory framework prevailing at the time) reduces economic welfare since it limits the ability of train operators to increase fares in the more inelastic market. More generally, the study concluded that the more widely a fares basket is defined, the greater the economic welfare for any given level of revenue raised.

E3.10 However, while the resulting structure of fares may be well aligned with the objective of economic efficiency, it is likely to be challenged on grounds of fairness. The Ramsey pricing rule provides a mechanism for apportioning a defined revenue requirement across passengers in different markets, but it is not a basis for allocating costs between them. Hence, while it retains some link between fare levels and costs, the relationship between the two will generally be less clear cut and more difficult to justify in terms of fairness than under simple marginal cost pricing. This will be particularly the case where, as at present, the majority of a train operator's costs are effectively fixed, and marginal costs are both low and similar across services. In these circumstances, differences in fares set according to the Ramsey pricing rule will be primarily the result of differences in elasticities, and hence in variations in passengers' willingness to pay.

Interaction with other markets and externalities

E3.11 The implementation of Ramsey pricing is further complicated where the markets concerned are subject to externalities (costs and benefits which, in the absence of government intervention, are not reflected in prices) and/or interact with related markets for complementary or substitute products. The pricing rule defined in paragraph E3.4 is based on the assumption that cross-price elasticities are zero, which is clearly unrealistic in the case of many rail markets. Moreover, the interactions in demand for rail and other transport modes are complex. For example, car travel can be both complementary to rail travel (as in the case of journeys to and from the station) and a substitute for it (as in the case of journeys between urban centres).

E3.12 Taking the particular example of car as a competitor to rail, it is possible to illustrate how the interaction between travel markets complicates marginal cost pricing and, by extension, the application of the Ramsey pricing rule. According to economic theory, pricing at marginal cost will be sub-optimal where the price charged for a substitute product is above or below marginal cost. If, for example,

car travel is priced below marginal cost, rail services should be priced in a similar way in order to avoid a sub-optimal balance between car and rail traffic.

E3.13 While it may appear, given the existence of fuel and vehicle excise duty, that car travel is generally priced above marginal cost, this depends on how marginal cost is defined. A rigorous pursuit of economic efficiency requires that prices are set equal to marginal social cost, which includes externalities such as congestion and the impact of carbon emissions[19]. Notwithstanding the existence of various forms of taxation on car travel, given the lack of congestion pricing for both national and local road networks and the evidence of growing congestion in many urban areas, it is likely that the price of many car journeys is significantly below marginal cost, properly defined. Indeed, from an economic welfare perspective this provides one of the main reasons for subsidising rail and other forms of public transport.

E3.14 Taking account of market interactions and externalities in setting Ramsey prices is, however, complex. The constrained optimisation problem underpinning the derivation of the pricing rule needs to incorporate demand and cost conditions in a wide range of markets, and optimal pricing will depend on cross-price elasticities as well as social marginal costs of both rail and related activities. At the same time, train operators could be expected to take account of competition from other modes when deciding where to increase mark-ups over marginal cost and would be unlikely to set fares that were unsustainable. Nevertheless, modifying the regulatory framework to reflect divergences between private and social marginal cost through the price cap mechanism is likely to prove challenging.

E4 IMPLICATIONS FOR FARES REGULATION

E4.1 Considered against the theoretical framework described in the previous Sections, the regulation of rail fares in Great Britain appears to have led to a structure of fares that is sub-optimal in economic terms. While an economically efficient fares structure that takes account of all relevant interactions and externalities would be difficult to define, it is nevertheless possible to identify key shortcomings in fares regulation resulting in mismatches of demand and capacity. In correcting for these, it is important to consider the scope for improving the efficiency of capacity allocation, while recognising the importance of other objectives, such as fairness, and the need to reduce transport's impact on the environment.

E4.2 The regulation of peak fares is a particularly important issue, given the widespread crowding on trains serving London and other major urban areas during peak hours. As noted in Section E1, the crowding problem is exacerbated by the availability of season tickets, which generally allow unrestricted use of specific services at a zero marginal price to the passenger at all times of the day. In addition, the cost of a season ticket is significantly below the equivalent cost of travelling on a standard fare, particularly in the case of longer journeys, where the weekly season ticket fare may be as low as that of one-and-a-half round trips on Anytime tickets.

[19] Estimates of emissions by transport mode generally suggest that emissions per passenger-kilometre are higher for car than for rail travel, although we note that this depends critically on the load factor assumptions used in the calculations.

E4.3 Season ticket prices are therefore contributing to the peak capacity problem in a number of ways:

- The regulation of season ticket prices through the commuter fares basket has kept a high proportion of peak fares below the level needed to align demand with capacity. This problem was accentuated by the temporary replacement of the fares basket with regulation of individual fares, preventing train operators from securing the benefits of more flexible regulation discussed in Section E3.
- The season ticket product, as currently specified, prevents train operators from using season ticket fares to redistribute demand over the peak period and into the shoulder peak. Hence, while relaxing the regulation of peak fares, and allowing them to rise further, would reduce overall peak demand, the nature of the product means that it cannot be used to manage demand hour-by-hour or train-by-train.
- The discounts available to longer distance travellers through the purchase of season tickets appear particularly difficult to justify in economic terms. A possible rationale for a lower ratio of season ticket to full fare on longer journeys is that longer distance commuters tend to make fewer journeys per week and therefore require a lower price if they are to purchase a season ticket product. However, as individual travellers they make the same claim on capacity as passengers making shorter journeys, and hence the same contribution to capacity costs.

E4.4 It is nevertheless important to recognise that season tickets have advantages from the perspective of the train operator as well as the passenger. They represent a commitment to travel on the part of the passenger, at least over the short term, helping the operator to plan and providing significant cash revenues in advance. They also reduce sales costs and help to reduce fraud, removing the need for passengers to obtain proof of their entitlement to make a journey each time they travel. The challenge therefore lies in identifying a fares structure that allows at least some of these benefits to be retained, while encouraging a more efficient use of peak capacity.

E4.5 More generally, assessed in terms of economic efficiency, there is a need for fare levels to be better aligned with the availability of capacity through the day. As noted in previous Sections, the availability of off-peak regulated fares generates substantial demand at certain times of the day, specifically immediately outside the peak, which cannot be easily accommodated. At present, these products provide passengers with the same "claim" on capacity as those who have paid an Anytime fare, including the ability to reserve a seat, notwithstanding that they are walk-on rather than advance purchase fares (with the result that there is no incentive to purchase an Anytime fare when regulated Off-Peak fares are available). There is therefore a case for either raising fares available in the shoulder peak or redefining the off-peak product such that it is clear to passengers that it does not carry the same entitlement as a standard product (e.g. it might be sold on the understanding that a passenger may not get a seat or even their train of choice).

E4.6 At the same time, there is a need to encourage efficient utilisation of off-peak capacity where it is currently underutilised. While the discussion of Ramsey pricing

above indicated that train operators will anyway be incentivised to charge relatively low fares in elastic markets, actual off-peak fares may be higher than optimal during much of the day, because of the constraints imposed by the application of the price cap to individual fares. Following the results of the Institute for Transport Studies, University of Leeds analysis reviewed in Appendix A, it can be argued that the introduction of flexible price cap regulation covering a wide range of fares would result in significantly lower off-peak fares to offset rises in certain peak fares. At the same time, the impact of changes to the fares baskets is difficult to determine because of the complexities of interactions between different fare types, both inside and outside the current scope of the baskets.

E4.7 In addition, there may be a case for further intervention to secure a reduction in fares on particular routes in order to secure other policy objectives, for example modal switch from car to train, to reduce carbon emissions or to relieve bottlenecks on road networks that occur outside peak hours. In these circumstances, a regulatory requirement to reduce specific fares, reflecting the positive externality from reduced car traffic, could help to encourage the rail alternative.

E4.8 For all changes involving a significant rebalancing of fares, it will be important to understand the impact on different income and social groups, not least to identify potential unintended side effects. For example, higher rail fares in the peak might affect unemployed passengers engaged in job searching, making it more difficult for them seek employment opportunities in different parts of the country. Broad changes in fares policy will generally need to be accompanied by measures to mitigate such impacts.

E5 MODELS ATTRIBUTING RAILWAY COSTS TO SERVICES

Comparing average costs and revenues in other railways

E5.1 In the largely centrally-funded rail industry of Great Britain, it is relatively easy to compare fares revenue and cash expenditure on an annual basis, and hence to estimate the ratio of average revenue to average cost over the industry as a whole. This is, in essence, the basis of the McNulty Review's scoping study observation that the overall cost of running Britain's railway has risen but income from users has not kept pace, meaning an increased call on the taxpayer.

E5.2 Comparisons even of average costs and revenues, and hence levels of support, are not always easy elsewhere in Europe, for three main reasons:

- Varying treatment of the costs and revenues of freight activities, and in particular the proportion of infrastructure costs allocated to them, which in Great Britain derive ultimately not only from customer revenues but also Government's policies for support and from ORR's economic analysis.
- Funding of the rail industry through different mixes of national, regional and local government, whether through the funding of infrastructure, the specification of fares levels, provision of rolling stock, or direct support to operations. In our 2007 report "International comparisons of rail networks and policy lessons for Scotland" for Transport Scotland we were only able to identify consolidated industry costs and revenues in one country, Sweden.

- Funding of capital expenditure may be episodic or "lumpy", and may be either expensed in the year it is incurred or paid for in the longer term through access charges and lease payments. Financial results for a single year may not reflect the long term relative levels of costs and revenues.

E5.3 We have not identified any national rail industry which compares revenues with medium or long term average costs including negative externalities, such as noise and pollution, and positive externalities, such as road congestion relief.

Comparing average costs and revenues in Great Britain

E5.4 We list below a number of attempts to model the costs of the rail industry of Great Britain at varying degrees of disaggregation, from the first computer-based model of the industry to the current Network Modelling Framework. Members of our team were involved in the specification and detailed modelling in all of these studies. None has resulted in estimates of costs by service group which would result in a credible fares structure. Identifying the average, marginal or incremental costs of a service group is of little help to defining the millions of fares it will offer.

E5.5 The 1982 "Report on Railway Finances" ("Serpell Report") examined the costs and revenues of BR's profit centres, roughly equivalent to today's franchises. By comparing them with infrastructure costs, it investigated the level of support required for different sizes of network and whether any network could be financially self-sustaining. The work required many simplifying assumptions, and was widely criticised, but represented the first computerised attempt to compare revenues and costs by operating geography. A difficulty common to this and all subsequent work has been the need to apportion fixed, joint and common infrastructure costs on routes used by more than one railway business. This issue is inherent to the industry irrespective of the organisational or ownership model.

E5.6 In 1989 BR carried out further studies of possible models for restructuring and privatisation using financial information disaggregated only by passenger sector.

E5.7 In 1990 BR's Network SouthEast (NSE) commissioned a strategic review which led to the development of a detailed model of demand, revenue and costs by route and service group within the London commuter area. A by-product of the analysis was estimates of the incremental costs, by service group, of peak services, if these were deemed to "cause" the provision of infrastructure and rolling stock assets, and off-peak services, if these could be operated on a marginal cost basis with assets already provided for the peak.

E5.8 From 1991, analysis supporting the design of the restructured rail industry considered how infrastructure charges could best send economic signals to the future infrastructure manager and franchised and open access operators, but there was little consideration of relating this to the level and structure of fares, which instead was preserved, subject to the addition of the RPI-X regulation regime.

E5.9 From 1993, a major programme of work was carried out to establish Railtrack's "vesting" access charges to the operators. The need for, and causation of, every element of track or signalling was reviewed, although it was still necessary to devise conventions by which to apportion many fixed, joint and common costs to operators. In addition the analysis, while highly complex, did not attempt to

distinguish peak and off-peak requirements. The Rail Regulator retrospectively approved and adopted these charges, but subsequent regulatory reviews have focused on different issues and have not repeated the process. More widely, ORR has only limited responsibility for, or interest in, train operators' costs.

E5.10 The most comprehensive model of the industry currently available is the Network Modelling Framework (NMF) developed to estimate the costs of different levels of industry output as part of the 2008 Periodic Review, which led to the setting of the High Level Output Specification (HLOS) and Statement of Funds Available (SoFA) for Control Period 4 to April 2014. The NMF allows operating costs to be estimated by rolling stock fleet but not by service group, and there is no provision to apportion costs to time of day. However, it would be possible to rebuild the NMF, using principles similar to those adopted in the 1990 NSE work, to identify marginal costs of peak, shoulder-peak and off-peak services by service group.

Lessons learned from past cost and revenue comparisons

E5.11 The analysis which most closely meets the requirements of this study is modelling of the Network SouthEast services, which is now 20 years old. While documentation of the study may no longer be accessible, a number of key findings of the analysis are relevant to the current study.

E5.12 First, the analysis identified the long run incremental costs (LRIC) of operating peak services as including the costs of:

- Provision and maintenance of all necessary infrastructure
- Provision and maintenance of all necessary rolling stock
- The costs of staff, train crew, energy and cleaning of peak services

E5.13 Off-peak services were allocated only the remaining costs of staff, train crew, energy and cleaning incurred as a result of continuing to operate services outside the peak. The analysis suggested that at least 80% of the costs of the railway would continue to be incurred even if all off-peak services were withdrawn.

E5.14 The analysis, and the partly arbitrary conventions needed to complete it, raise a number of issues which would need to be resolved before attempting to relate fares to any measure of marginal or incremental costs:

- Fares in London would need to vary widely not only between corridors but also between operators in the same corridor, precluding both interavailability and a zonal structure. Some short-distance fares would in theory need to be higher than long-distance ones on adjacent tracks: even if practical, this would be inconsistent with the expectation that fares should rise with distance.
- Peak fares would be higher on lightly-used lines, particularly in rural areas, where the infrastructure costs would need to be borne by fewer passengers.
- Peak fares might vary little with distance, because each passenger at the most heavily loaded point on a train or route imposes the same cost, irrespective of whether he occupies the train on other parts of the route.
- Counter-peak and off-peak fares would be very low, because these services impose few additional costs. This might require regulation of these fares to below the current profit-maximising Off-Peak and Advance fares.

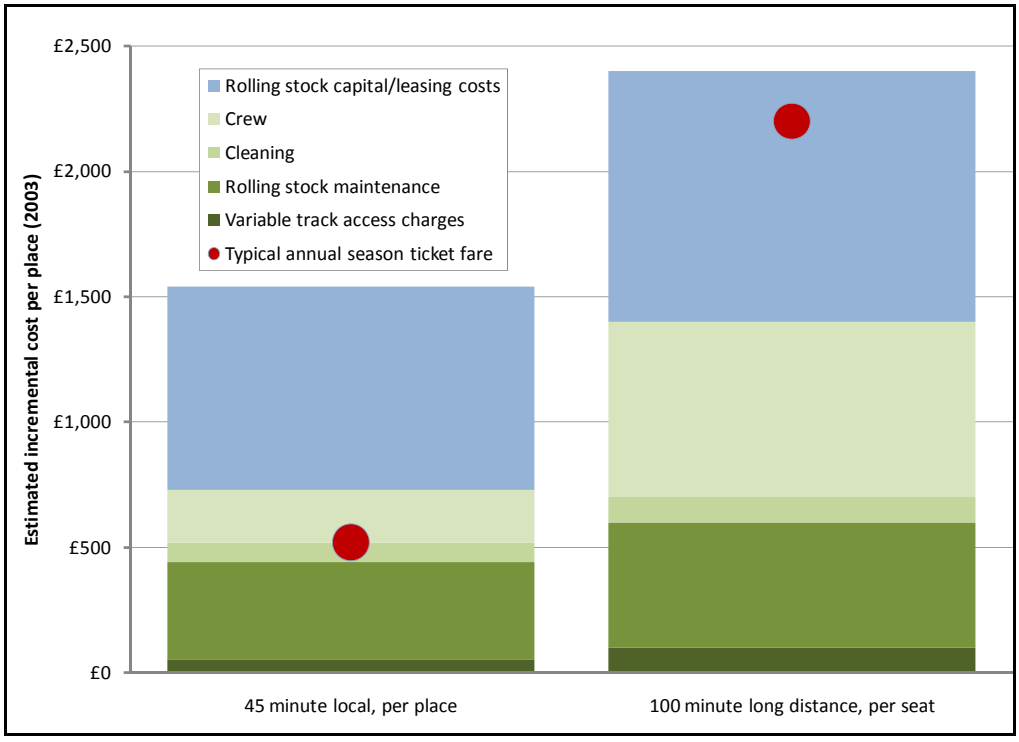
E5.15 It is, of course, possible to "adjust" this theoretical approach, to average fares by corridor or route, or to impose some minimum variability with distance applicable in the peak, counter-peak and off-peak. However, such adjustments would need to be essentially judgemental and would arguably need to be policy- rather than economics-based. As noted in E2.25 any averaging, by definition, tends to run counter to the principles and benefits of marginal cost pricing.

E5.16 More recently, SRA's "Fares Review Conclusions 2003" included analysis by ATOC of "average incremental costs" which we have reinterpreted in the Figure below to illustrate some of these points. ATOC provided estimates of the costs of providing an additional seat on a 100-minute journey and an additional space on a 45-minute journey, allowing for the planning standard that passengers may stand for up to 20 minutes.

E5.17 We have not examined ATOC's original analysis, although we note that it appears explicitly to exclude infrastructure costs, the allocation of which to train operators, let alone to the ultimate customers, has long proved problematic. However, working from the bottom of the chart:

- An additional off-peak train might impose only variable track access charges (VTAC) and some rolling stock maintenance costs, crew and cleaning costs.
- An additional shoulder-peak train might also require further trains to be leased, but fit within existing infrastructure capacity.
- An additional peak train might require additional infrastructure, although ATOC did not attempt to identify this in their evidence.

AVERAGE INCREMENTAL COSTS AND REVENUES PER PLACE, 2003



Source: ATOC analysis, 2003, from SRA Fares Review 2003

E5.18 ATOC estimated that average incremental costs, excluding fixed infrastructure costs, were around £2,400 per seat for a 100-minute journey and £1,540 per space for a 45-minute train journey, which can be restated as £2,080 per seat, or only 15% less than a 100-minute journey. This suggests that the costs of unit capacity vary more due to differences in the space allocated to passengers under the planning standards than due to differences in the distance travelled by the train.

E5.19 ATOC noted that the average extra revenue generated by selling an additional season ticket covered 92% of these costs on a 100-minute train journey but only 34% of them on a 45-minute journey.

E5.20 It is possible to adopt a convention which allocates these costs to users of the infrastructure at peak periods, many of whom will hold season tickets, and to adopt a policy that each should bear at least their share of these costs, including some element of infrastructure costs over and above VTAC.

E5.21 It is also necessary to adopt a policy on how these costs should be distributed between peak passengers according to the distance they travel, but the SRA did not discuss how this should be done.

E5.22 However, ATOC's analysis compares a subset of costs with a subset of revenues, but does not identify what fares would result or whether peak trains would be left overcrowded or underused. Taken in isolation, it does not even show that the services examined would not cover their costs at current levels of fares.

E5.23 Finally, and as noted above, identifying the average, marginal or incremental costs of a service group is of little help to defining the millions of fares it will offer.

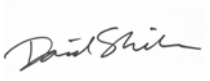
CONTROL SHEET

Project/Proposal Name	Research Project on Fares (NRP 10026)
Document Title	Final Report: Analysis, Recommendations and Conclusions
Client Contract/Project No.	NRP10026
SDG Project/Proposal No.	22336501

ISSUE HISTORY

Issue No.	Date	Details
1	20 December 2010	Issued as Report on Part One
2	28 January 2011	Issued as Report on Part Two
3	28 February 2011	Revised and issued as Final Report, following comments from the study steering group

REVIEW

Originator	Dick Dunmore	
Other Contributors	Sarah Berman, Matthew Clark, Kevin Dadswell, Andrew Davies, Tony Duckenfield, Duncan Edmondson, Simon Ellis, Sam Livingstone, Will Parker, Dave Shilton, Jiao Wang	
Review by:	Print	David Shilton
	Sign	

DISTRIBUTION

Client:	The Rail Value for Money Study
Steer Davies Gleave:	

C:\Users\rfineman\Desktop\Report on Part Two 110525 FINAL FOR PDF AND PUBLICATION.docx