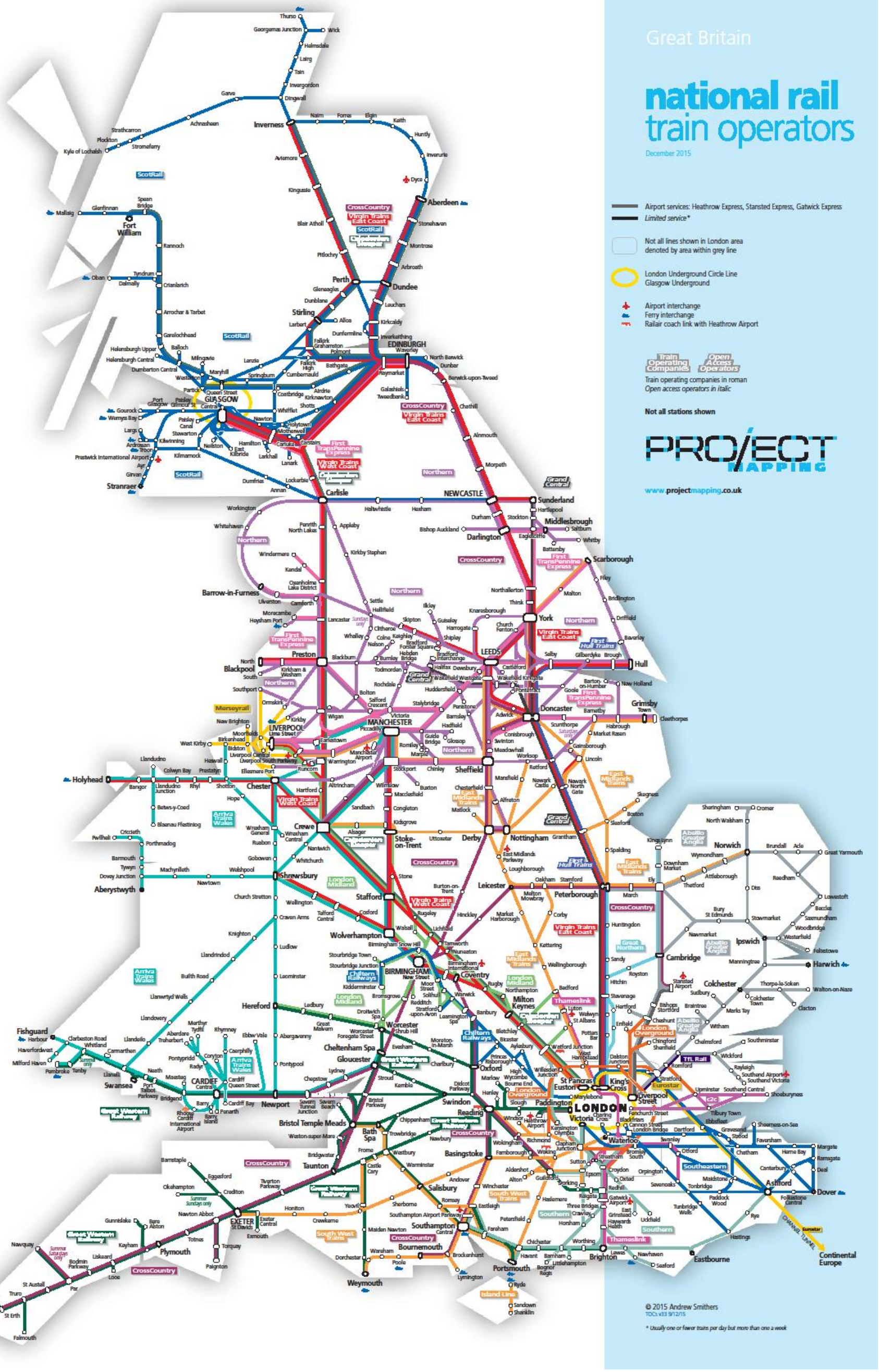
Competition in passenger rail services in Great Britain: a policy document

Appendix

Contents

A. Map of train operators in Great Britain (December 2015)



Source: Project Mapping.

B. List of open access proposals submitted to ORR from 2000 to 2015

Row	*Year*	*Operator*	*Service*	*Approved?*
A	2000	Hull Trains	London to Hull	Yes
B	2002	Hull Trains	Additional daily return: London to Hull	Yes
C	2004	Hull Trains	Additional daily return: London to Hull	Yes
D	2004	Grand Central	Newcastle to Manchester via Bradford	No
E	2005	Hull Trains	Additional daily return: London to Hull	Yes
F	2006	Hull Trains	Additional daily return: London to Hull	Yes
G	2006	Grand Central	Sunderland to London	Yes
H	2006	Grand Central	York to Chester	No
I	2007	Wrexham & Shropshire	Wrexham to London	Yes
J	2009	Grand Central	Additional daily return: Sunderland to London	Yes
K	2009	Platinum Trains	Edinburgh to London	No
L	2009	Hull Trains	Harrogate to London	No
M	2010	Grand Central	Bradford to London	Yes
N	2011	Grand Central	Blackpool to London	No
O	2011	Alliance Rail	Blackpool, Carlisle, Leeds and Bradford to London Euston	No
P	2011	Alliance Rail	Bradford, Leeds to London	N/A[1]
Q	2012	Grand Central	Additional daily return: Sunderland to London	Yes
R	2012	Grand Central	Additional daily return: Bradford to London	No
S	2013	Grand Central	Additional daily return: Bradford to London	Yes
T	2014	Alliance Rail	Blackpool, Leeds to London	N/A[2]
U	2014	Great North Western Railway Company Limited	Blackpool to Queen's Park London Leeds to Queen's Park London	No
V	2014	Great North Eastern Railway Company	Edinburgh to London King's Cross	TBC
W	2015	Hull Trains	Extension of some services to/from Beverley	Yes
X	2015	Great North Eastern Railway Company	Bradford to London King's Cross Cleethorpes to London King's Cross	TBC
Y	2015	East Coast Trains Limited	Edinburgh to London King's Cross	TBC

[1] Alliance Rail withdrew its application to ORR due to abstraction at Leeds.
[2] Alliance Rail's application was superseded by the application in Row U.

C. On-rail competition in Europe

Overview of open access competition and market structure in each country

Italy

Overview

1. In Italy, the main OAO, NTV, entered the market in 2012 and its market share in 2014 was around 20 to 25% (in terms of passenger miles) of all national high-speed services. NTV primarily competes on the Turin–Milan–Venice and Milan–Rome–Naples high-speed routes.[3]

2. The high-speed services are not covered by public service contracts (PSCs) and the OAO competes across all the high-speed commercial services provided by the downstream arm of the state-owned incumbent holding company, Trenitalia. In contrast, PSOs are clearly defined on regional/suburban services and long-distance traditional (non-high-speed) services: in 2012 PSO services represented 54% of overall passenger miles and 21% of long-distance passenger miles.[4]

3. In Italy, PSCs are often directly awarded to the incumbent train operator. Open access is possible when PSOs are in place, but OAOs' entry is subject to an economic equilibrium assessment.[5] In 2013, the incumbent operator's share of the overall passenger rail transport services was over 80%.[6]

Structure of the market

4. In Italy, there is a vertically integrated holding company, Ferrovie dello Stato, which is subject to legal, functional and accounting separation obligations between the network operator (RFI) and the incumbent train operator (Trenitalia).[7] In recent years, gaining non-discriminatory access to stations and depots and commercial spaces within the stations has been difficult for the Italian OAO, NTV.[8] However, a recent regulation from the newly

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[3] Telephone conference call with NTV. Further details of NTV's operations are available on its website.
[4] EU Commission RMMS questionnaires – Annex 15 of Staff Working Document SWD (2014) 186. OECD, Recent Developments in Rail Transportation Services 2013.
[5] In particular, access is denied if the incumbent PSC operator's profits are reduced more than 50% in a specific PSC. Steer Davies Gleave Consultancy, Research for European Commission, DG Move, 2012.
[6] The residual non-incumbent market share not accounted for by the high-speed OAO is held by rail companies operating some regional/suburban transport services under concessions. EU Commission – SWD (2014) 186 final.
[7] Call with the Italian Transport Regulator (ART).
[8] As detailed in Chapter 3, paragraphs 3.88–3.90.

established transport regulator[9] tackled competitive distortions, imposing transparency and non-discrimination obligations.[10]

5. In contrast, network capacity does not appear to be a competitive constraint in Italy as open access competition has developed exclusively on the high-speed line, which is completely separated from the traditional line and currently uncongested.[11] In Italy, track access charges are the same for all operators and are comprehensive covering operating and capital costs.[12] For access charges on the high-speed services/lines, the Italian network operator has been allowed to fully recover all its network investments[13] over its concession length (25 years). In October 2014, the high-speed track access charge was reduced by the regulator in order to enhance competition.[14]

6. In Italy, the availability of rolling stock has been an important entry barrier for OAOs given that the incumbent owns almost all of the rolling stock in the country (ie no separation is in place between the provision of rolling stock and Trenitalia). NTV therefore had to undertake major investment to buy new rolling stock.[15] In September 2015, NTV signed a contract worth €460 million with Alstom for the purchase of eight Pendolino high-speed trains, and a maintenance contract for 20 years. The new trains will expand NTV's existing fleet and offer additional high-speed journeys to its passengers. The first trains are expected to enter service in 2017.

Czech Republic

Overview

7. In the Czech Republic, there are two OAOs (Regiojet and Leo Express). They started their operations in 2011 and 2012, respectively, competing on the Prague–Ostrava route with the publicly owned incumbent train operator, Czech Rail. The OAOs currently run a total of 30 services per day on the Prague–Ostrava route.[16]

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[9] The Italian (multi-modal) transport regulator, ART, was established in 2013.
[10] ART Regulation 70/2014.
[11] There is some congestion at hub and station level but further network investments are expected.
[12] Ordinary and extraordinary network maintenance costs are instead financed by the government (call with ART).
[13] Accounting for 15% of the original cost, with the government financing the remainder.
[14] Access charges decreased from €14/km to €8.2/km (call with ART).
[15] Study on regulatory options on further market opening in rail passenger transport – Everis 2010 for DG Move. The Everis report also highlighted that the impact of open access would be much larger in Italy if a third of existing rolling stock were to be transferred to separate leasing companies.
[16] Calls with Regiojet and Leo Express. Further details of the operators are available on the Regiojet and Leo Express websites.

8. Czech Rail currently has no PSOs on this route and the two entrants hold a market share of between 60 and 70% on the route.[17] All other regional, suburban and long-distance services are covered by PSOs, which in principle cannot prevent or limit the entry from OAOs. However, PSCs have traditionally been directly awarded to the incumbent, which has a share of around 95% of passenger rail services.[18] PSOs in the Czech Republic cover 98% of all passenger rail services overall and 21% of the long-distance services.[19] However, OAOs have planned the introduction of commercial services in other regions of the Czech Republic, where the scope of the incumbent's PSOs might be subject to revision by the government.

Structure of the market

9. In the Czech Republic, after a European Commission infringement procedure in 2011, infrastructure management has been clearly separated from train operations and is undertaken by a public body (SZDC).[20] Non-discriminatory third party access to the network is guaranteed, although some network functions (such as secondary track repairs) were initially maintained by the incumbent train operator and transferred to the network operator only recently.[21] Track access charges are the same for all operators and are relatively low, as are retail prices of tickets. In the Czech Republic, the incumbent operator owns the rolling stock. However, availability of rolling stock does not appear to have been a major problem for OAOs, which either purchased new rolling stock (as Leo Express did) or leased second-hand stock from Austria and Italy (as in the case of Regiojet).[22]

Austria

Overview

10. In Austria, an OAO (Westbahn) has been providing long-distance passenger services on the Vienna–Salzburg route since 2011, where it competes with the downstream arm of the publicly owned incumbent holding company, OBB.[23] Westbahn currently has around a 20 to 25% share of rail services on the route, which is essentially the only route in Austria not covered by PSOs.

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[17] Calls with Regiojet and Leo Express.
[18] Competitive tender procedures for PSOs have been planned by the government for some routes with operations starting from 2016.
[19] EU Commission RMMS questionnaires – Annex 15 of Staff Working Document SWD (2014) 186.
[20] A legislative provision prescribing some level of vertical separation has been in place since 2002. Telephone conference call with the Czech Ministry of Transport. OECD, Recent Developments in Rail Transportation Services 2013.
[21] Steer Davies Gleave Research for European Commission, DG Move, 2012.
[22] Call with the Czech Ministry of Transport.
[23] Call with Westbahn. Further details of Westbahn are available on its website.

Overall, the incumbent holds 87% of the passenger rail transport market in terms of passenger miles.[24]

11. PSOs in Austria cover 66% of all services overall and 34.5% of the long-distance services.[25] There are no competitive tenders for the PSCs, which are directly awarded to the incumbent. Open access entry is theoretically possible in the whole market, with no economic equilibrium assessment, but has only occurred where the routes are profitable and the incumbent's services are not subsidised (ie international routes and the Vienna–Salzburg route).

Structure of the market

12. In Austria, the vertically integrated holding company, OBB, is subject to obligations of legal, functional and accounting separation between its upstream and downstream activities. Path allocation has to be made in a neutral manner and prioritisation criteria are defined in a general and non-discriminatory way.[26] There is a non-discrimination obligation for track access charges, which are the same for all operators. The track access charges cover only variable costs and some mark-up on the more profitable lines, such as the Vienna–Salzburg route.[27] There is no separation in place and all rolling stock has to be approved by the infrastructure manager. This caused some initial problems for OAO entry, although Westbahn now has its own dedicated double-decker rolling stock.

Sweden

Overview

13. In Sweden, a number of OAOs have entered the market since 2010, including Veolia, Skandinivska Jernbanors and Tagkompaniet.[28] The OAOs compete on the three main long-distance routes within the Stockholm–Gothenburg–Malmö triangle. The Swedish OAOs have differentiated their services from those provided by the incumbent, SJ.[29] An additional OAO, MTR, launched services

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[24] EU Commission RMMS questionnaires – Annex 15 of Staff Working Document SWD (2014) 186.
[25] EU Commission RMMS questionnaires – Annex 15 of Staff Working Document SWD (2014) 186.
[26] In the prioritisation criteria, international services have preference over long-distance services and both have preference over local services. Public services are prioritised only in peak-hours (call with the Austrian Transport Regulator).
[27] Call with the Austrian Transport Regulator.
[28] Call with Trafikanalys, the Swedish public agency in charge of policy and data analysis in the transport sector. FSR (2012), Governance of competition in the Swiss and European railway sector – Final research report to the SBB lab, University of St.Gallen.
[29]For example, Veolia introduced a low cost service between Stockholm and Malmö; Skandinaviska Jernbanor started a tourist-oriented service between Stockholm and Gothenburg; and Tagakeriet runs services between Gothenburg and new destinations in the Dalarna County. Notably, all these services use older, slower trains and operate relatively low frequency services.

in direct competition with the incumbent in March 2015 on the Stockholm–Gothenburg route, which is currently the most profitable route in Sweden.[30] MTR is now operating eight services per day (while SJ has 18), using new rolling stock and offering a journey time comparable to that of the incumbent.[31]

14. At present, 47% of all train passenger services in Sweden are covered by PSOs, but only 2% of long-distance services are covered by PSOs.[32] In Sweden, PSCs have been procured via competitive tenders for the last 20 years, allowing new entrants to progressively increase their market shares. The market is completely open and commercial services may coexist with services operated under PSCs. However, in practice, OAOs tend not to compete with subsidised PSC operators (either incumbent or entrant). In addition to PSC services and commercial services, there is a hybrid form in which commercial service providers agree with the regional public authority to provide some PSOs. In 2013, SJ held a market share of around 90% of long-distance rail services (in the triangle routes) and 55% of regional rail services.[33]

Structure of the market

15. In Sweden, infrastructure management has been separated from train operations since 1988[34] and is currently managed by a public body (Trafikverket). Such a long period of vertical separation has resulted in a clear-cut distinction between the activities of infrastructure manager and train operators. However, the administrative procedure for capacity allocation has been subject to criticism, particularly regarding its transparency and efficiency, in part due to a lack of predefined and transparent prioritisation criteria.[35] For these reasons, the capacity allocation procedure is currently under review,[36] especially in light of three operators competing on the Stockholm–Gothenburg route in 2015.

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[30] MTR has been active in the Swedish market since 2009 when it took over operation of the Stockholm metro network under an eight-year contract. Further information is available on its website.
[31] MTR's journey time is about 20 minutes longer than SJ's (on a 3-hour journey). MTR estimates that half of this gap is due to network signalling technology tailored for the incumbent's rolling stock (call with MTR).
[32] EU Commission RMMS questionnaires – Annex 15 of Staff Working Document SWD (2014) 186.
[33] EU Commission RMMS questionnaires – Annex 15 of Staff Working Document SWD (2014) 186.
[34] Sweden was the first country in Europe to create vertical separation in the market, which took place in 1988.
[35] At present, the process consists of an application to the transport administration (network operator) in April each year, which tries to accommodate all requests and include adjustments to the previous year's scheme. Any conflicts are resolved via negotiations, both between operators and the transport administration and between the operators themselves.
[36] An ongoing comprehensive review of the rail system being undertaken in Sweden by a government committee. The final report was published in December 2015 (information provided by the Swedish government committee for the reorganisation of railways sector).

16. Track access charges are the same for public service operators and OAOs and are based on estimated ordinary usage depreciation per gross tonne kilometre and differentiated on the basis of congestion and traffic levels.[37] There is a policy debate in Sweden about the level of the track access charge, which is considered by many to be relatively low.[38]

17. There are a number of technical barriers to the development of competition in Sweden, due to capacity constraints and the small number of intercity routes (with low population density being a particular barrier).[39] There is no horizontal separation of rolling stock and most rolling stock for long-distance services belongs to the incumbent. The leasing procedures have been described as problematic.[40] Consequently, in order to directly compete with the incumbent, OAOs have needed to buy new rolling stock (for example, MTR purchased new trains from Swiss manufacturer Stadler Rail). Conversely, at the regional level, the regional transport authorities have created a leasing joint-stock company (Transitio) which pools and leases trains to winners of regional bids.

18. MTR told us that the incumbent's ticket retail platform, which is the main channel for ticket sales and information about connections both at regional and national level, is not open to all competitors and is therefore a potential barrier to entry.[41] MTR has not been allowed to access SJ's website and ticketing system and has consequently filed a complaint before the Swedish competition authority (KKV), which found that SJ's actions were compliant with competition law as the website was not an essential facility.[42]

Germany

Overview

19. In Germany, there are no legal regulatory barriers to market entry. However, open access on-rail competition is quite limited. The downstream arm of the publicly owned incumbent holding company, Deutsche Bahn (DB), provides more than 99% of long-distance rail services, operating exclusively on a

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[37] Additional minor charges are levied. Sweden has also implemented a performance regime.
[38] Information provided via email from the Swedish government committee for the reorganisation of railways sector.
[39] For instance, Stockholm is geographically located in a capacity bottleneck, although expansion of the network is ongoing (a tunnel accessing the Stockholm area is under construction).
[40] For example, a potential OAO, Sundsvallsflyg, a small airline flying between Stockholm and Sundsvall wanted to compete on the Stockholm–Sundsvall rail route. It applied for train paths but never started its business, because it could not find rolling stock. Steer Davies Gleave Research for European Commission, DG Move, 2012.
[41] The retail sales and ticketing problem has been broadly discussed in the industry and at political level in Sweden. As a result the industry has jointly launched an alternative website, on which it is possible to search for all connections and to buy tickets provided by all operators and public transport authorities. The use of this alternative channel is, however, still very limited compared with the incumbent's website.
[42] EC Competition Briefing, 2014.

commercial basis (without subsidies).[43] On the Hamburg–Cologne route there is some degree of on-rail competition between DB and an OAO (HKX).[44] The latter entered the market in 2013, covering a low-price segment, and currently holds around a 5 to 10% market share on the route. HKX expanded its network in December 2015 when it extended selected Hamburg–Cologne trains to serve Bonn, Koblenz, and Frankfurt.[45]

20. Regional/suburban services, which are operated under PSC and cover 59% of all rail services, are increasingly allocated via competitive tenders (currently around 60%) and the incumbent, DB, has 80% of the rail market.[46] At the regional level there is therefore relatively strong competition for the market, but no open access on-rail competition.

Structure of the market

21. In Germany, the vertically integrated incumbent, DB, includes the incumbent train operators (DB Regio, DB long-distance and DB freight) at downstream level and the infrastructure manager (DB Netz), the station manager (DB Station & Service) and the energy supplier (DB Energie) at upstream level. Functional and legal separation obligations are in place. However, the strong market position of the incumbent represents an entry barrier for long-distance OAOs.[47] Moreover, infrastructure bottlenecks and capacity constraints also limit open access market entry.[48] In relation to capacity allocation, there is no formal prioritisation of the incumbent DB's services over other operators' services. However, there have been a number of complaints about a lack of transparency in the procedure.[49]

22. The track access charge is based on full cost recovery and is among the highest in the EU. The track access charge includes a base charge (differentiated by track categories and track usage) plus a product charge, depending on several service parameters (eg prioritisation in timetabling, the

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[43] Information provided via email and via telephone conference call by the German Network Regulator (BNetzA).
[44] HEX, is active on the Harzt–Berlin route, and another OAO, Veolia, was active in the Rostock–Berlin–Leipzig route from 2011 to 2014 but Veolia has recently terminated those services. Finally a start-up cooperative OAO, Locomore, is currently pioneering the use of crowdfunding to finance a Stuttgart–Berlin service, which is due to begin in September 2016. Details available on Locomore's website.
[45] Further information is available on HKX's website.
[46] Information provided by BNetzA. FSR (2012), Governance of competition in the Swiss and European railway sector – Final research report to the SBB lab, University of St.Gallen.
[47] See Steer Davies Gleave Consultancy, Research for European Commission, DG Move, 2012.
[48] Like Italy, Germany has a backbone rail axis connecting many large cities, including Munich–Frankfurt–Cologne–Hannover–Hamburg. However, unlike in Italy, Germany high-speed services do not run on dedicated high-speed lines.
[49] Steer Davies Gleave Research for European Commission – DG Move, 2012; Monopolkommission (2011) Sondergutachen 60 – Bahn 2011: Wettbewerbspolitik unter Zugzwang. The capacity allocation rationale is that longer routes paying overall higher charges to DB Netz are given priority over shorter routes. The incumbent often runs services over longer routes and often receives *de facto* priority over potential entrants.

number of special trains, etc).[50] Finally, as in most European countries, there is no separation between the incumbent train operator and rolling stock provider and limited rolling stock availability may be an additional barrier to entry for prospective long-distance OAOs.

23. In July 2015, the German Monopolies Commission published its fifth special report on competition in the rail sector.[51] The report concluded that the majority of travellers would benefit from functioning competition and urged policymakers to be more active in advancing competition in the sector. In particular, the report advocated the complete separation of the infrastructure and transport units of Deutsche Bahn AG in order to reduce the risk of discriminatory behaviour against competitors.

24. In the long-distance market, the report recommended that in order to protect competition the existing system should not be replaced by one run by public authorities.

25. The report also advocated a reduction in the involvement of public authorities in the procurement of rolling stock in order to avoid crowding out a private sector market.

D. EU rail legislation

Background

26. Over the past two decades, the EU has developed a number of packages aimed at restructuring the European rail transport market in order to strengthen the position of railways in relation to other transport modes. The EU's efforts have concentrated on three major areas which are all crucial for developing a strong and competitive rail transport industry:

- opening the rail transport market to competition;
- improving the interoperability and safety of national networks; and
- developing rail transport infrastructure.[52]

[50] In Germany, a performance regime is in place, under which either train operators or the network operator have to pay for delays. Information provided by BNetzA.
[51] Monopolkommission (22 July 2015), Special Report on competition on German railway markets.
[52] European Commission website: Rail.

27. The First Railway Package, adopted in 2001, was the European Commission's first step in opening the European rail market to competition.[53] Some of the key features of the First Railway Package included the introduction of accounting separation between the infrastructure manager and operators (in Great Britain, of course, there is full separation between Network Rail as infrastructure manager and the train operators), a system for access charging, and non-discriminatory access to capacity and rail-related services. The First Railway Package was recast in order to clarify existing provisions relating to the funding and management of infrastructure, access to rail-related facilities (depots, maintenance, etc) and the independence and competence of regulatory bodies. The recast directive (Directive 2012/34/EU) was finalised in November 2012 and is expected to be transposed into UK law in spring 2016.

28. In 2004, the Second Railway Package was introduced, with the aim of reducing barriers to entry as a result of standards and rules specific to member states. This was through the establishment of the European Railway Agency to support interoperability in the market as well as providing safety and technical support. The Second Railway Package also liberated the market for freight transport in 2007.[54]

29. The Third Railway Package, introduced in 2007, gave passenger railway companies the opportunity to compete on international routes, with the market for international passenger transport opening in 2010.

Proposed Fourth Railway Package

30. In January 2013, the European Commission proposed measures intended to bring a single European rail market a step closer.

31. The European Commission set out a number of problems that the Fourth Railway Package was designed to address.[55]

    - The first set of problems identified relate to access to the market for domestic passenger services as, unlike in Great Britain, many member states have not opened these markets to competition. The consequence of this is that significant differences exist between member states that

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[53] European Commission (2009), 'Commission Warns Member States over Lack of Implementation of 'First Rail Package', Press Release IP/09/1438.
[54] Oxera (November 2013), 'Agenda – The Fourth Railway Package: does one size fit all?'
[55] European Commission (2013), 'Proposal for a Directive of the European Parliament and of the Council amending Directive 2012/34/EU of the European Parliament and of the Council of 21 November 2012 establishing a single European railway area, as regards the opening of the market for domestic passenger transport services by rail and the governance of the railway infrastructure – explanatory memorandum', COM (2013) 29 final.

have opened their market for domestic passenger services to competition and those that have not.

- The second set of problems relate to the governance of infrastructure managers, which are natural monopolies. The European Commission is concerned that infrastructure managers do not always react to the needs of the market and its users, thus hindering the performance of the sector as a whole.

32. The 'market pillar' proposals for the Fourth Railway Package of the European Commission concentrate on four key areas:[56]

- **Infrastructure governance** – the European Commission proposes to increase the role of infrastructure managers so that they control all the functions at the centre of the rail network.

- **Opening of the market for domestic rail passenger services** – the European Commission is proposing to open up domestic passenger railways to new entrants and services from December 2019. Companies will be able to offer domestic rail passenger services across the EU either by offering competing commercial services for those that can be provided through open access (competition 'in' the market) or through transparent and cost-efficient award of public service contracts (competition 'for' the market), provided that the access granted does not compromise the 'economic equilibrium' of a public service contract.[57] As is currently the case for international rail passenger services, the relevant regulatory bodies will have the responsibility to determine whether the 'economic equilibrium' of a public service contract is compromised by undertaking objective economic analysis based on predetermined criteria.[58] Under the current proposal, member states will not be obliged to liberalise domestic passenger railways to a greater extent than is currently the case in Great Britain.

- **Interoperability and safety** – the European Commission's proposals seek a greater level of harmonisation at EU level in order to reduce administrative costs and to remove market access barriers.

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[56] European Commission (2013), 'The Fourth Railway Package – completing the Single European Railway Area to foster European competitiveness and growth', COM (2013) 25 final.
[57] Ibid.
[58] See proposed amendment to Article 11 of Directive 2012/34/EU of the European Parliament and of the Council of 21 November 2012 establishing a single European railway area, as regards the opening of the market for domestic passenger transport services by rail and the governance of the railway infrastructure.

- **The social dimension** – member states will be able to protect workers by requiring existing staff to be transferred to new contracts when public service contracts are transferred between suppliers.

33. On 8 October 2015, the Council endorsed the Commission's approach on the proposals to liberalise domestic rail passenger services and strengthen the governance of railway infrastructure, and negotiations can now start with the Parliament. Both institutions need to approve the proposals before they can become law.

34. The final wording for the legislative measures in the 'technical pillar' of the Fourth Railway Package was agreed on 17 June 2015 at an informal trilogue meeting between the Latvian Presidency of the EU, the European Parliament's Transport and Tourism Committee and the European Commission. On 30 June 2015, the Council of the European Union confirmed that an agreement was reached with the European Parliament on faster and less burdensome vehicle authorisation and safety certification procedures for European railways (together the updated interoperability and safety directives and European Railway Agency regulation make up the 'technical pillar'). The adoption of the various legislative acts that comprise the 'technical pillar' requires the approval of both the Council and the European Parliament.

35. Although the rail system in Great Britain is already compliant with most aspects of the Fourth Package, there are a number of areas in which the UK is continuing to focus negotiations to ensure that:

- the proposals are compatible with 'alliance agreements' in place between Network Rail and individual train operators, which aim to facilitate more integrated working on specific projects in order to achieve cost savings (eg finding ways of better managing stations, ensuring engineering works are better planned or improving train punctuality);[59]

- infrastructure managers can continue to subcontract work or lease assets to other bodies;

- large rail franchises linking England with Scotland or Wales are permitted; and

- the ability to make direct awards of rail franchises for over two years is retained in case of a problem with the franchising system.

[59] Network Rail: Alliances.

36. The proposed recast of Directive 2012/34/EU establishing a single European Railway Area and the right of access for domestic passenger services could require the adjustment of the current NPA rule, depending on the criteria that are ultimately applied as part of the 'economic equilibrium' test.

E. Network enhancements

Enhancements in the 2014–2019 Control Period (CP5)

37. In 2012, the Secretary of State for Transport issued a statement setting out to ORR what should be achieved on the rail network in Great Britain during CP5 (ie the five-year period in respect of which ORR sets access charges) from 1 April 2014 to 31 March 2019.[60] This is known as the High Level Output Specification (HLOS).

38. The HLOS was formulated on the basis of the Route Utilisation Strategies (RUS) devised by the industry for each of the network's ten routes.[61] The government's strategic intent is to ensure that, until completion of High Speed 2 (HS2), the network is developed to shoulder increasing demand, but then quickly adapt and integrate around the high capacity HS2 corridor.[62]

39. In response to the government's HLOS and as part of ORR's periodic review of Network Rail's revenue requirements for CP5, Network Rail published its Strategic Business Plan for England and Wales in January 2013. Network Rail is committed to delivering HLOS outputs and, in particular, it plans to improve the capacity and capability of the railway by delivering 20% more morning peak seats into central London and 32% more peak seats into major regional cities by the end of CP5 (moving 225 million more passengers per year).[63]

40. Network Rail's outputs and milestones for every project through CP5 are set out in its CP5 Enhancements Delivery Plan, which was published in December 2014[64] and updated in January 2016 following the report from Sir

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[60] DfT (16 July 2012), *High level output specification 2012.*
[61] RUS process applied to existing services, identifying capacity requirements and proposing interventions to meet them. RUSs will gradually be replaced by the Long Term Planning Process (LTPP). This has been designed to enable Network Rail and industry stakeholders to respond flexibly to growing demand for rail services (including entirely new services), while planning for the network's long-term capability up to 30 years ahead.
[62] High Speed 1 (HS1) is the railway between St Pancras in London and the Channel Tunnel and connecting the UK with international high-speed routes.
[63] Network Rail (January 2013), Strategic Business Plan for England & Wales, pp3, 11 & 66.
[64] Network Rail (December 2014), CP5 Enhancements Delivery Plan. The Enhancements Delivery Plan together with the Delivery Plan, which was published in March 2014 and updated in March 2015, sets out the projects that Network Rail will deliver over CP5. It is the 'contract' against which ORR will measure Network Rail's performance and is also intended to assist train operators, funders and stakeholders to plan their businesses with a reasonable degree of assurance in CP5.

Peter Hendy on the replanning of Network Rail's Investment Programme.[65] The enhancements planned for CP5 are designed to meet the additional passenger demand forecast over the period, as set out in Table 1.

Table 1: Estimated demand for rail services in 2018–2019

HLOS	*Peak 3 hours**		*High peak hour*	
Major cities†	*Forecast passenger demand in 2013–2014‡*	*Extra passenger demand to be met by 2018–2019*	*Forecast passenger demand in 2013–2014*	*Extra passenger demand to be met by 2018–2019*
London	539,300	119,000	268,500	54,200
Birmingham	37,500	3,900	19,200	1,800
Leeds	25,400	5,100	13,000	2,800
Manchester	28,100	6,200	13,600	2,600
Others	34,800	4,900	16,500	2,000

Source: Network Rail.
* The peak three hours covers all weekday services timetabled to arrive in the morning between 0700 and 0959; the high peak hour covers all weekday services timetabled to arrive in the morning between 0800 and 0859.
† Birmingham stations are: New Street, Snow Hill and Moor Street; Manchester stations are: Oxford Road, Piccadilly and Victoria; Leeds is the single station; other urban areas are Bristol, Leicester, Liverpool (excluding Merseyrail), Newcastle, Nottingham and Sheffield, because these cities are current significant users of rail for commuting.
‡ All forecast figures relate to franchised passenger services.

41. By April 2019, Network Rail is required to deliver a range of improvement works, including upgrading station facilities (such as introducing access arrangements and toilets), implementing schemes that will allow longer or more trains to run (for example, longer platforms), introducing electrification to enable more reliable electric trains with faster acceleration to run and meeting power supply demands from increases in capacity.

42. For CP5, the planned enhancement works include nearly £6 billion of enhancements that had already started or that had been committed by government from previous announcements.[66] The projects to which funding is already committed include the following:

- **Thameslink** – increasing capacity on the Thameslink route from north to south through central London. The upgrade, due to be completed in 2018, will include a major rebuild of London Bridge station, platform lengthening to accommodate new 12 coach trains, station upgrades and new operating technology (including new signalling and train automation) in

[65] The Hendy report, published on 25 November 2015, outlined a £38 billion programme to operate, maintain, renew and improve the rail network across the country. The Enhancements Delivery Plan Update forms part of that review and sets out the outputs, obligations, scope and milestones for the projects that were included in the Enhancements Delivery Plan for CP5.
[66] Network Rail (January 2013), Strategic Business Plan for England & Wales, pp46 & 67.

central London to facilitate a metro-style service of up to 24 trains per hour in each direction.

- **Crossrail** – this is a new integrated railway route through central London from Reading and Heathrow Airport in the west to Shenfield in the north-east and Abbey Wood in the south-east. When Crossrail opens in 2018, it will increase London's rail-based transport network capacity by 10% and dramatically cut journey times across the city. Crossrail will deliver new train services and reduced journey times with up to 24 trains per hour between Paddington and Whitechapel during peak times.

- **Great Western electrification** – extending electrification of the Great Western main line into Wales, allowing for electric services to operate, will reduce costs and increase capacity as new trains will be able to accelerate and stop more quickly. The reliability of services is also expected to increase. The work is expected to be completed by 2019.

- **Reading** – station redevelopment and track configuration. The new layout and viaduct to the west of Reading to take fast main lines over freight and relief lines was completed at Easter 2015 (12 months ahead of schedule) and will increase capacity and reduce delays.

- **North West electrification** – overhead electrification and associated power supplies and distribution along a number of north eastern routes will improve travel between Manchester, Liverpool, Preston, Blackpool, Leeds and York. In June 2015, the Secretary of State for Transport announced that the electrification project would be paused as part of Sir Peter Hendy's work to reset Network Rail's upgrade programme.[67] In September 2015, the Secretary of State announced that the electrification work would continue.[68] The new plan will deliver faster journey times and significantly more capacity between Manchester, Leeds and York. The upgrade is expected to provide capacity for six fast or semi-fast trains per hour, take up to 15 minutes off today's journey time between Manchester and York and be complete by 2022.

- **Northern Hub** – a project of targeted upgrades enhancing the network between and into Liverpool, Manchester, Manchester Airport, Leeds and other destinations in the North of England. The project includes new track, infrastructure upgrades, platform lengthening and upgraded stations.

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[67] Secretary of State for Transport's Statement on Network Rail's performance, 25 June 2015.
[68] Announcement by the DfT, 30 September 2015.

Scheduled to complete in 2019, it will allow up to 700 more trains to run each day and provide space for 44 million more passengers a year.

- **InterCity Express Programme** – enhancement works (including traction power supply capability) to introduce InterCity Express trains up to 260 metres long to replace the current fleet of High Speed Trains (sometimes known as the 'InterCity 125' fleet) on the Great Western main line from 2017 and East Coast main line from 2018 onwards.

43. Over £6 billion of additional enhancements are required under the HLOS, including the following:

- **Electric Spine** – a major north–south rail electrification enhancement to improve regional and national connectivity, creating a high-capability 25kV electrified passenger and freight route from the south coast via Oxford and the Midlands to South Yorkshire. The majority of the work is due for completion in 2019. In relation to the Midland Mainline, Sir Peter Hendy is proposing that line speed and capacity improvement works already in hand are added to, with electrification of the line north of Bedford to Kettering and Corby by 2019 and the line north of Kettering to Leicester, Derby/Nottingham and Sheffield by 2023.

- **London Waterloo** – a project is under way to provide additional capacity at Waterloo station and its approaches to meet increased demand. Signalling upgrades on the Wessex line are also under way.

- **Western access to Heathrow Airport** – a new rail tunnel leaving the Great Western main line between Langley and Iver to Heathrow Airport, allowing passengers to travel to the airport from Reading via Slough without going into Paddington station. Work is due for completion by 2021.

- **Welsh Valleys electrification** – a project to electrify the Great Western main line as far as Carmarthen and to electrify valley lines will improve reliability and increase capacity.

44. The HLOS sets out a number of further capacity enhancement schemes, including improvements such as new junctions on routes including the West Coast main line and the Anglia route.

45. A separate Strategic Business Plan was prepared by Network Rail for Scotland in response to Scottish Ministers' HLOS. The Scottish Ministers' HLOS requires over £1.4 billion of capacity and capability enhancements, including the Edinburgh to Glasgow Improvements Programme which involves

electrifying the route between Scotland's two major cities, providing faster services.[69]

Longer-term enhancements

46. By 2035, the rail industry aspires to deliver capacity that will accommodate twice as many passengers as today.[70]

European Rail Traffic Management System

47. The rail industry will move from conventional signalling to the European Rail Traffic Management System (ERTMS). ERTMS consists of two basic components: the European Train Control System, which is an automatic train protection system (often known as 'in-cab signalling'); and GSM-R, a radio system for providing voice and data communication between the track and the train. In essence, a computer in the driver's cab supervises the speed of the train, taking into account the movement of other trains on the railway. Using this technology, trains can run faster and closer together. The system will also be able to recover quickly from delays.

48. The introduction of ERTMS will not itself solve bottlenecks at stations and junctions. The mix of traffic that the rail network must carry (including suburban, regional, intercity and freight) may also restrict the extent to which capacity can be fully utilised. However, we were told by Network Rail and ORR that, on balance, ERTMS has the potential to offer some increase in capacity relative to the current system.

HS2

49. HS2 – the proposed high-speed network linking London with the Midlands and the North – is being developed by the DfT and High Speed Two Limited (HS2 Ltd). HS2 Ltd, an executive non-departmental public body sponsored by the DfT, is funded by a grant-in-aid from government and performs both a delivery and advisory role in the development of the high-speed rail network.[71] The plan is for HS2 to introduce approximately 352 miles of new track linking London (Euston) to Birmingham and Birmingham to Manchester and Leeds.[72]

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[69] Network Rail (January 2013), Strategic Business Plan for Scotland, pp49 & 66.
[70] This includes capacity generated by HS2.
[71] See HS2 website.
[72] See DfT (11 September 2013), High Speed Two: an engine for growth.

50. The budget for HS2 is £42.6 billion over 20 years, including contingency of £14.4 billion.[73] Phase 1 of HS2, which is expected to open in 2026, will see high-speed services run between London Euston and Birmingham, many of which will continue to other destinations using the 'classic' rail network. Phase 2 is planned to form a 'Y' shape from the West Midlands up towards Manchester and the North West with proposed stations at Manchester Airport and Manchester Piccadilly; and up towards Leeds and the North East with proposed stations in Leeds, the East Midlands and Sheffield Meadowhall.

51. HS2 could treble the number of passenger seats on trains into London Euston once in full operation (increasing peak-hour seats from 11,300 to 34,900) and almost double the number of trains per hour on the West Coast main line. The initial Phase 1 service plan for HS2 could see seating capacity double in 2026 (and more than double where the crowding pressure is greatest). At peak times, up to 18 trains could be scheduled to run per hour in each direction with trains able to carry as many as 1,100 passengers.[74]

52. HS2 will relieve the conventional rail lines from London to the north of England, including the West Coast, Midland and East Coast main lines. The conventional lines will still be used for commuter and regional services and by services calling at stations between key cities such as London and Birmingham.

53. The DfT told us that although HS2 will release capacity on the 'classic' West Coast main line, some of this capacity will be specified to remove duplication between classic and HS2 services, to ensure that HS2 and classic rail services are fully integrated and to make use of the capacity freed up by the introduction of HS2 to improve the rail services to certain locations.[75] These principles are considered by the DfT to be fundamental to the HS2 business case.

F. Rail capacity and auctions

Introduction

54. The potential for train timetables to be drawn and capacity to be allocated between companies by means of an auction process has garnered substantial

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[73] The DfT has made the point that that there are potential risks to the HS2 business case, such as reduced timetable coordination, which could arise from greater on-rail competition. The DfT also made the point that open access competition could limit the government's ability to secure the financial benefits of the major, upfront investment.
[74] Ibid.
[75] The economic case for HS2, PFM v4.3: Assumptions report, October 2013.

attention from economists and auction theorists over the past 30 or so years.[76] It was also considered directly at the time of privatisation in the UK.[77]

55. In order to assess the potential for this type of approach to be applied under the two sub-options, Options 4(a) and 4(b) (described in Chapter 6), we discuss below the relevant academic literature, drawing largely on Perennes (2014) and on Starkie (1993). We also reflect on some of the ideas put to us during our consultation.

56. The overall conclusion we draw from these sources is that it is unlikely that a timetable could be drawn through an auction process alone, but that auctioning bundles of paths from an existing timetable which has been designed by a central body would be possible. Therefore, although using an auction system may at present be unable to solve the 'complete system' of drawing the timetable, which we discuss below, it may be successful in solving a 'restricted' version.

57. We consider an approach such as this could deliver significant benefits in terms of allocating capacity, in particular under a competitive licence-based system proposed in our Option 4.

The potential for auctions

58. Auctions have the potential to solve asymmetries of information between the central planner or system operator and companies closer to the market. If appropriately designed they have the ability to create a market in conditions where one would not normally arise, and in particular to allow scarce resources to allocated efficiently.

59. Auctions, or reverse auctions, have frequently been used in other deregulated industries to allocate capacity and to establish a market-based mechanism to coordinate firms where their actions impact upon each other. For example, electricity market designs using a 'pool' system, or the balancing market component of the UK's current wholesale market design, serve the purpose of coordinating the generation activities of large numbers of power plants across the network. These auction rules seek to match supply decisions to demand and network conditions, by using schedules of time-dependent bids submitted by generators. Auctions have also been used to allocate slots at airports and spectrum frequencies in telecommunications.

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[76] Perennes, P, 'Use of combinatorial auctions in the railway industry: Can the "invisible hand" draw the railway timetable?', *Transportation Research Part A 67* (2014), pp175–187.
[77] See, for example, Starkie, D (1993), *Train Service Coordination in a Competitive Market*.

The challenges of designing auctions for rail capacity

60. The industries discussed above all have particular features which make organising services challenging. For example, electricity transmission and distribution grids need to balance supply and demand at any given time or the network will either overload or collapse and shut down entirely.

61. Rail operations are no different in having a number of features which pose challenges.

62. Firstly, paths are 'rivalrous', or 'rigid',[78] in a number of senses:

    (a) a path requires platform 'slots' at origin, intermediate stop, and destination stations, and trains are unable to share them;

    (b) a path will also typically require slots at intermediate stations where the service does not stop;

    (c) a path requires clear sections of track for a given time, frequently termed blocks, and two or more trains cannot be in a block at the same time;

    (d) trains cannot typically overtake each other between stations; and

    (e) paths need to take into account servicing and depot access.

63. Secondly, the value of a particular train path is contingent on the overall pattern of service.[79] It would depend on the existence of:

    (a) substitute services: if another, similar, service were run shortly before or after a service, the value of that path may fall due to the closeness of competition it provides;

    (b) complementary services: connections at either end of a path, or into intermediate stations along a path, may increase the value by increasing the demand on it; and

    (c) compatibility with other services run by the operator: running dense services in area, or in areas which were connected, can increase the ability of operators to efficiently utilise their rolling stock and other resources and so the operation of one track would affect their willingness to pay for the right to operate other tracks.

[78] This description follows largely from Perennes (2014).
[79] As above this description largely follows Perennes (2014).

64. This second property means that if the whole timetable were arranged through an auction, which may be considered the 'complete' problem, bidders would need to enter bids for each path or block contingent on the outcome of bids for a number of combinations of outcomes of other paths or blocks. The class of auctions used to solve problems of this nature is known as combinatorial auctions. There has been a significant degree of research in this area[80] and combinatorial auctions are used for both airport slots and radio spectrum.[81]

65. The question of whether it would be possible to design a combinatorial auction to establish the entire rail timetable is discussed in Perennes' 2014 article *Use of combinatorial auctions in the railway industry: Can the 'invisible hand' draw the railway timetable?* The conclusion of this paper is that there are essentially two key obstacles:

    (a) designing an auction system that would effectively translate bidders' preferences into paths which met the criteria above and which are computationally feasible; and

    (b) the information burden placed on participants in such an auction to provide enough valuations for paths contingent on the outcomes of other paths.

66. Perennes, and Borndorfer et al (2005),[82] conclude that both these problems currently pose significant challenges, with the auction literature unable to solve the necessary track allocation problems. Perennes cites Ho et al (2012) as reaching similar conclusions.

67. Perennes considers that the costs of the information burden imposed on parties wishing to submit contingent bids into a combinatorial auction would increase in an exponential manner with the number of potential paths at stake. Perennes contrasts this with the costs of planning a timetable for a central infrastructure manager and considers that these are linear in fashion, and therefore less costly for rail networks above a certain size.

68. Perennes therefore concludes that using a combinatorial auction to determine the timetable is impossible, but that the approach of an infrastructure manager drawing a timetable and then auctioning paths or bundles of paths will be more feasible. This would be a means of solving a more 'restricted' problem.

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[80] See, for example, Cramton, P, Shoham, Y, and Steinberg, R, eds, *Combinatorial Auctions*, 2006, MIT Press.
[81] Perennes (2014).
[82] Perennes (2014)..

69. David Starkie (1993), in his article *Train Service Coordination in a Competitive Market,*[83] and in his response to our consultation, is somewhat more positive about the potential for auctions to create an initial timetable, but reaches similar conclusions:

> The conflicts inherent in the interdependent nature of the bids can be resolved eventually but the processes would be complex, time consuming and would not necessarily produce an optimum outcome for the market as a whole, because each bid is made blind of the position of competitors in the market.
>
> Simplifying alternatives are: to make use of the timetable [existing at the end of the current franchise periods] and to invite bids for pre-specified parts or 'packages' of that timetable … or for bidders to form their own service packages from the existing timetable …[84]

70. The proposal to auction packages of an existing timetable is in line with what a number of respondents to our consultation have suggested regarding Option 4. Virgin/Stagecoach favoured Option 4:

> Of the options proposed by the CMA for intercity routes, we consider a system of licensing multiple operators subject to appropriate conditions is the best way forward (i.e. Option 4). A letting agency – either the DfT, ORR or an independent government body – would auction bundles of paths from a pre-written national capacity statement. This licensing system could be successfully operated on the major intercity routes.[85]

71. Network Rail did not advocate a particular option, but commented in relation to Option 4 that:

> CMA's option 4 discusses quite a lot of operators on each part of the network. If this approach were to be adopted, in order to be able to make best use of network capacity, a system akin to the premier League TV rights could be appropriate. This could see pre-determined packages of access rights being bid for, with a limit on the total of packages that any one train operator is allowed to win. With this approach, it might be most appropriate

[83] Starkie, D (1993), *Train Service Coordination in a Competitive Market*.
[84] David Starkie's consultation response.
[85] Virgin/Stagecoach's consultation response, paragraph 4.

for the infrastructure manager to carry out the auction (as is the case with the Premier League).[86]

72. Cave and wright (2010) consider a number of means for using combinatorial auctions which may reduce the information burden on participants and make the process more tractable. These include dividing predetermined paths into groups such as morning peak, evening peak and off-peak, holding an auction for the total number of paths within these categories, then either holding subsequent auctions to define exactly which paths within these categories are assigned to the bidders or having the system operator assign them itself.

73. Both Cave and Wright (2010) and Starkie (1993) emphasise the role that secondary trading of rights would play in allowing market participants to correct any suboptimal allocations of rights which would arise from an auction process, and also to react to changes in demand.

74. Dividing predetermined paths into smaller bundles and auctioning them on an ongoing basis would also reduce the complexity of using auction methods. Building in a degree of flexibility such that rights were auctioned in a loosely determined nature, and holding auctions of small numbers of rights periodically, could allow competition on a slowly developing timetable.

75. While not directly comparable, an interesting approach to using combinatorial auctioning for small bundles of bus routes used by Transport for London (TfL) is described by Estelle Cantillon and Martin Pesendorfer (2006).[87] Soon after privatisation TfL decided to continue to use a timetable determined centrally but to gradually move towards a position where a number (typically between 2 and 21, with an average of 3.7) of bus routes were auctioned every few weeks on a rolling basis.[88] Operators were able either to submit bids for whole packages of routes or for one or more individual routes within these packages. If taking the latter approach they would do so in a combinatorial manner, ie with bids for each route contingent on winning or not winning other routes within the package.

76. The routes tendered by TfL in this manner are for fully franchised services, with no service differentiation and both upside and downside risk held by TfL. If rights were allocated and competition were allowed to occur between operators bound only by timetabling obligations, a similar model does,

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[86] Network Rail's consultation response, p9.
[87] Cantillon, E, and Pesendorfer, M, *Auctioning Bus Routes: The London Experience*, in Crampton et al, eds, *Combinatorial Auctions* (2006).
[88] Ibid, p574.

however, offer a possible approach for how the balance of services within a rail timetable could be allowed to develop without central planning.

77. As indicated in the responses by Network Rail and Virgin/Stagecoach, there would need to be rules in place to ensure that under Option 4, there was competition present on all or the majority of flows. This would effectively mean preventing operators gaining control of collections of rights which would allow them to exercise market power and so raise prices.

78. For the trading-based Option 4(b), a mechanism would also need to be designed to decide which operators were assigned responsibility for particular unprofitable but socially valuable routes, as these would differ in how expensive they were to provide or finance.