Railways in Transition: A Review of Five Countries

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1. Background and purpose

The organisation of passenger railways is currently undergoing significant changes in a number of countries in Europe as well as in the rest of the World. Traditionally, railways have been organised nationally as state monopolies responsible for both infrastructure and services, but recent years have seen a move away from this model. In particular, infrastructure and services have been separated in EU countries (although in other parts of the world vertical integrated railways are still present) and there have also been initiatives regarding deregulation, internationalisation and privatisation. A key motivation for initiating reforms of the railway sector in the different countries is often a perceived lack of customer orientation and the cost inefficiencies due to a lack of competitive pressure. In this paper railway reforms in five countries will be reviewed: Japan, New Zealand, United Kingdom, Sweden and Denmark. These countries cover a number of dimensions of railway reform including privately vs. publicly owned companies, vertical integration vs. vertical separation, tendering vs. no tendering.

2. Japan

The Japanese railway system has a number of distinct characteristics compared to the organisation of railways in European countries, including: (1) Rail services are mainly provided by vertically integrated companies (although there are a few exceptions with companies only involved in operations), (2) Existence of private rail companies prior to the privatisation of Japanese National Railway, (3) Private railway operators receive almost no operations subsidies (most railway companies operate according to a full-cost principle, (4) No system of competitive tendering for provision of passenger services. A range of different types of heavy and light rail companies exist in the Japanese rail industry. Most of the rail companies are in private ownership, although public and public-private organisations also exist. The three profitable JR companies on the main island (JR East, JR Central and JR West) have not completed full floatation and the other JRs (Hokkaido, Shikoku and Kyushu) are 100% in public ownership. The typical rail company provides rail services in large urban areas. The main role of the 15 private rail companies is provision of rail services from the centre of the main city to suburbs in the large metropolitan areas (e.g. Tokyo and Osaka).

2.1 Privatisation of JNR

Following years of increasing operating deficits in the seventies and eighties the Japanese Government initiated discussions concerning how to improve the performance of JNR. In the end the plans implemented in 1987 entailed privatisation based on subdivision into six regional passenger companies and a freight company. Other models were considered, for example four regional subdivisions according to the four main islands, twenty regional subdivisions according to the JNR branch offices, and division into trunk lines and branch lines. The main characteristics of the reform of JNR are: (1) Horizontal separation (or regional subdivision); (2) Passenger-

freight separation; (3) Vertical integration (or operation and infrastructure integration); (4) Lump-sum subsidy for low density JRs (Hokkaido, Shikoku and Kyushu); (5) Allowance for non-rail service (e.g. real estate development) although so far JRs have had relative little involvement in non-rail businesses; (6) Establishment of an Intermediary Institution (Japan National Railway Settlement Corporation).

2.2 Characteristics

Terms and conditions for traffic rights

A license system regulates entry to the Japanese rail market with potential entrants required to hold a license to start services on specific lines. In this way the license system is line based. Five criteria have to be met in order for a potential entrant to be granted a license, including (Mizutani, 1999): (1) demand for the railway service is sufficient; (2) no imbalance between supply and demand for rail service; (3) the potential entrant takes on liability for providing service safely; (4) the potential entrant takes on financial and technological liability; (5) the rail services are in the public's interest. Once a license has been granted there is no limit to the length of a rail license apart from the situation where a license is lost due to negligence. The vertically integrated companies have an exclusive right to the infrastructure through ownership.

Competition with regard to time and place

The Japanese railway system does not include competition for or on the track and the license system applied by Government to regulate entry would, all else being equal, limit the extent of competition. However, there are other forms of competition present in the Japanese rail industry such as: yardstick competition; competition between parallel rail lines connecting pairs of urban areas operated by different companies; intermodal competition from car and air is putting increased competitive pressure on railways.

2.3 Implications

Performance indicators

In Table 1 performance indicators for the Japanese railway sector are presented. The table suggests an improved level of productivity, mainly due to significant labour costs over the last two decades (in particular around the time of privatisation).

Table 1. Performance indicators for the railway sector in Japan

	1980	1982	1984	1986	1988	1990	1992	1994	1997
Total route km	22236	23371	23103	21961	20934	20254	20254	20255	20175
Passenger km (m)	193143	190767	194180	198299	217587	237551	249603	244375	247652
Freight ton-km (m)	37000	29770	22447	19945	23000	26803	26219	24100	24339
Passengers (m)	6825.0	6742.0	6884.0	7104.0	7761.0	8268.4	8651.6	8812.8	8952.5
Freight tons (m)	122.0	92.9	72.7	59.8	55.7	59.3	56.4	53.5	47.8
Ratio of passenger fares to freight rates	1.29	1.42	1.61				2.08	2.11	
Staff	380096	368646	310033	214175	198164	193763	193196	193145	146828
Ratio of total wages to total revenue	0.76	0.70	0.67			0.29	0.33	0.38	
Total locomotives	3970	3495	2577	2013	1753	1659	1747	1598	1479

Source: World Bank Railways Data Base, 2000
http://www.worldbank.org/html/fpd/transport/rail/rdb.htm

Change in industry structure
Since the creation of the JR companies and the enactment of the Railway Enterprise Law in 1987 (the law is applicable to all rail companies) a number of new entrants to the rail market have emerged as shown in Table 2. The net increase occurred from 1986 to 1991 (with the biggest increase in 1987). These new operators come from two main sources:

- Local branch lines of JNR established as quasi-private railways (public-private involvement)
- Construction and opening of new suburban commuter rail services

Table 2. Transition in number of passenger rail operators and total route length

Year	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**
No of operators	103	121	129	133	131	137	136	136	135
Total route-km	25051	27175	27293	27025	27017	26971	26970	27002	27077

Source: Mizutani (1999)

3. New Zealand

Starting in 1982 a process of restructuring the New Zealand railways system was initiated involving both regulatory and institutional changes in order to achieve a more efficient and customer oriented company. The process of restructuring culminated in 1993 with the privatisation of the New Zealand Railways to a private consortium (Tranz Rail). Subsequently, the restructuring and reorganisation of NZ Railways has continued in order to compete effectively with other modes. At present the main characteristics of the New Zealand railway system concern: (1) Tranz Rail Ltd, a private multimodal transport company operating rail, trucking and ferry services organised as a vertical integrated company; (2) All passenger rail services are provided by Tranz Rail Ltd. Tranz Rail Ltd is the former NZ Rail Ltd (until 1993 a publicly owned and operated company). New Zealand adopted a three phased reform approach towards changing the public agency responsible for the New Zealand railway system prior to 1 April 1982 (New Zealand Railways Department) to reach the present system: (Phase 1) Commercialisation and corporatisation (1982-1990); Phase 2 Deregulation (Road Haulage Sector (1983)); Phase 3 Privatisation (1993). A main purpose for embarking on the restructuring was to allow NZ Railways to operate on more commercial terms including improvement to the financial performance. The deregulation of the road haulage sector had important implications for the New Zealand railway system due to the majority (approximately 70%) of revenue for NZ Rail coming from freight services.

3.1 Characteristics

Terms and conditions for traffic rights
Tranz Rail Ltd enjoys an exclusive right to use the New Zealand rail network through its ownership of the infrastructure. However, clauses in the contract regarding the sale of NZ Rail Ltd to Tranz Rail allows the Government to put lines out to tender if patronage drops below 50% of present levels for passenger services (a similar clause is in effect with respect to the freight services). Furthermore, it should be noticed that

the New Zealand Government has retained the ownership to the right of way land. Tranz Rail leases the land from New Zealand Railways Corporation (a Government owned enterprise).

Competition with regard to time and place
Tranz Rail Ltd enjoys a monopoly in the provision of rail based passenger services. No other rail operators are present within the New Zealand rail markets. However, competition is strong between modes. The Tranz Rail passenger services face competition from the private car (both commuter and long distance services) and air for long distance travel between the North and South Islands.

3.2 Implications

Performance indicators
In Tables 3 indicators of performance are presented for the New Zealand rail industry as a whole.

Table 3. Performance indicators for the railway sector in New Zealand

	1980	1982	1984	1986	1988	1990	1992	1994	1997
Total route km	4478	4418	4273	4219	4257	4029			3913
Passenger km (m)									
Freight ton-km (m)	3226	3265	3165	3051	2924	2744	2475	2835	3505
Passengers (m)	16.0	14.3	14.5	16.6			11.4	10.6	11.6
Freight tons (m)	11.8	11.5	10.6	9.6	8.9	8.3	8.7	9.4	11.5
Ratio of passenger fares to freight rates									
Staff	21010	20834	18213	14919	9939	8418	5397	4619	4604
Ratio of total wages to total revenue	0.68	0.65	0.53	0.57	0.56		0.49		
Total locomotives	438	444	299	276	264		205	200	357

Source: World Bank Railways Database, 2000
http://www.worldbank.org/html/fpd/transport/rail/rdb.htm

Table 3 shows a significant reduction in staff numbers during the period from 1982 to 2000. In particular, the period from 1982 to 1990 was characterised by substantial staff level reductions as a result of the restructuring of New Zealand Railways Corporation. The staff level reductions have resulted in a positive labour productivity change, although the improvement in total factor productivity is relatively less strong due to a higher level of other factors. In Cavana (1995) the scope for efficiency improvement from privatisation is questioned given the significant improvements during the 1982-1990 period. Indeed, the recent discussions at the Tranz Rail Ltd 2000 Annual Meeting concerning the need to concentrate on core business (freight) in order to improve performance highlight the problems operating a company with a broad portfolio of activities.

Change in industry structure
The restructuring of New Zealand's railway system since 1982 has not led to a change in industry structure in the sense that rail services are still only provided by a monopoly operator. This monopoly operator is the privatised New Zealand Ltd (since 1995 Tranz Rail Ltd).

4. Great Britain

Railway reform in the UK began in the early 1980s when there was a shift in focus of British Rail, the national rail provider, from production to commercial objectives. Restructuring was motivated primarily by the desire to gradually eliminate the subsidy, but also by the objectives of using private borrowing to finance investment and of improving the efficiency of the industry. Essentially the reform had two main characteristics. The first was the separation of the ownership of infrastructure and the operation of the rail network. Railtrack was established as the owner of the rail network. Second, contracts were negotiated with train operating companies to operate passenger services, which were divided into franchises.

4.1 The reforms of 1993

The wide-ranging reform plans set out in the 1992 White Paper were largely implemented by the Railways Act of 1993. The main reforms are as follows: A vertical split between the ownership of infrastructure and of operations. Railtrack plc, owner of the national rail infrastructure, was floated on the stock market in 1996. A horizontal separation of BR's passenger rail business into 25 train operating units, corresponding broadly to existing profit centres. These units were called train operating companies (TOCs), and were privatised via a franchising process conducted by the Office of Passenger Rail Franchising (OPRAF). The appointment of a Rail Regulator with powers to grant operating licences and to enforce compliance with those licences, and authority to regulate access to track, stations and depots. The Act also made the Regulator, and the Office of the Rail Regulator (ORR), responsible for the enforcement of domestic law in relation to railway services, the appointment of users' consultative committees, and promoting the network. Rights of access were made available to private freight operators without a franchise. The intention was that rights of access for new passenger service operators would be established immediately, in order to fulfil the third policy objective of improving the efficiency of the industry. However, because of concerns surrounding the Opposition Labour party's plans for a re-nationalisation of BR, the government decided that competition should be 'moderated', thus reducing the risk to investing in TOCs. Hence, open access was postponed until 2002. The creation and privatisation of three rolling-stock leasing companies (ROSCOs), who lease rolling stock to all companies operating passenger and freight services. The additional creation and privatisation of over 50 ancillary businesses.

4.2 Post-1997: a change of emphasis

Unlike much of New Labour's inheritance of the privatised industries from its Conservative predecessors, the railway industry was made subject to radical reforms by the newly elected government. Indeed, one of New Labour's key pledges in the run-up to the General Election was to 'safeguard our environment and develop an integrated transport policy to fight congestion and pollution.'[1] Once in government, however, it took until mid-1998 for a White Paper "A New Deal for Transport: Better for Everyone" to publish detailed plans. The policy set out would consider transport in an integrated fashion in order to engineer a switch from cars and lorries to buses and

[1] New Labour: Because Britain Deserves Better.

trains and, hence, reduce congestion and pollution. This change of policy, from the Conservatives' drive for efficiency, to a White Paper that called for an expansion of the railways, required substantial reforms to the structure of the industry. The White Paper, which was eventually implemented by the Transport Act 2000, proposed that a Strategic Rail Authority (SRA), supported by the Commission for Integrated Transport (to advise on policy), would lead the expansion. The ORR would be left to set track access charges, and would be subordinate to the SRA. As a result of the White Paper, OPRAF joined the remnants of the BRB to form the shadow Strategic Rail Authority (sSRA) in preparation for the inception of the SRA, which eventually came into being when the Transport Act became law in February 2001. According to the 1998 White Paper, the SRA would take the objectives of policy and translate them into a 'clear, coherent and strategic programme for the development of our railways' (DETR, 1998, para 4.12) and become 'the main regulator of passenger network benefits.' Crucially, the White Paper did not specify the sources of funding for the SRA's activities. Therefore, when the sSRA attempted to implement the slogan of its first chairman, Sir Alastair Morton, 'investment, investment, investment', it had to consider its options carefully. It quickly became clear that Railtrack's balance sheet did not provide the solution: as a result of a challenging regulatory regime, its cost of raising new capital was high, while the regulation of access charges was intended to reduce them, as opposed to increase TACs to finance new investment. Therefore, the sSRA's attention turned to using the powers that it had assumed (as part of its functioning in shadow form) from OPRAF to explore the possibility of using the balance sheet of the TOCs to finance new investment. This led to two changes in the franchising regime. First, the limited-period franchises (those of less than ten years in length), would be replaced by long-term franchises of up to 20 years, while those of ten years or more would be granted extensions in return for extra promises of investment. Second, the TOCs were encouraged to venture into infrastructure activities.

4.3 Implications

This section presents data on the impact of the reforms discussed in sections two and three on demand and supply in the rail industry. Table 4 shows the impact on passenger demand.

Table 4. Impact of reforms on demand in the UK passenger rail market

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
Passenger journeys (m)	770	740	735	761	801	846	892	947
Index	100	96	95	99	104	110	116	123
Passenger kilometres (m)	31,700	30,400	28,700	30,000	32,100	34,700	36,300	38,300
Index	100	96	91	95	101	109	115	121
Passenger receipts (£m)[1]	2,570	2,542	2,481	2,646	2,779	2,960	3,165	3,368
Index	100	99	96	103	108	115	123	131
GDP Index	100	103	104	107	111	114	117	120

Note to Table 4:
[1] At 1999/2000 prices.
Source: adapted from DETR (2000a)

These demand statistics suggest that the reforms of the 1990s have been largely successful in arresting the decline in the UK rail industry. However, it should be borne in mind that these data follow closely UK GDP, so the increase in the 1990s will include a large element of natural GDP-related growth. However, if we assumed an elasticity of rail demand with respect to GDP of unity, no secular time trend and that fare increases have offset service improvements, we find that between 1993/4 and 1999/00 there has been an 8% net increase in rail demand. Table 5 presents some statistics on post-privatisation changes in the supply-side of the UK rail market.

Table 5. Impact of reforms on supply in the UK passenger rail market

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000
Route kms for passenger traffic	14,31	14,3	14,35	15,0	15,03	15,0	15,03	15,0
Central government grants (£m)[1]	1,42	1,0	2,07	1,9	1,97	1,5	1,25	1,0
Rail employee jobs ('000)	135	128	113	79	51	43	48	49
Average weekly earnings (£)[2]	470.9	448.1	441.7	477.4	506.4	532.8	521.3	521.8
Passenger's Charter reliability	98.7	98.8	98.7	98.8	99.1	98.9	98.8	98.8
Passenger's Charter punctuality	89.7	90.3	89.6	89.5	92.5	92.5	91.5	91.9

Notes to Table 5:
[1] Excluding privatisation receipts, at 1999/2000 prices.
[2] For train drivers and assistants, at April 2000 prices.
Source: DETR (2000a)

Table 5 demonstrates some interesting effects of privatisation. Route kilometres open to passenger traffic have increased slightly, but punctuality and reliability have remained virtually unchanged. Following a large increase in government grants in the mid-1990s, they are now roughly similar to the levels observable in the 1980s (but, again, the cyclicality of government finances should be taken into account here). Perhaps the most interesting effect of privatisation has been on staffing levels and incomes. The number of rail employee jobs is now one-third of the total in 1985/86

(150,000), thanks mainly to the response of TOCs to fixed track access charges, which was to drive down operating costs in order to make money in the short term (Helm, 2001). This significant decline in jobs may also be partly explained by a reclassification of employees working in the rail industry. For example, an engineer involved in track maintenance would previously have been classified as working in the rail industry. This engineer may now be categorised as being employed in the engineering industry. On the other hand, driver incomes have increased slightly since 1992/93, perhaps as a result of competition between TOCs for drivers.

5. Sweden

In Sweden significant progress has been made concerning deregulation of the passenger railway, initiated by the 1988 Transport Policy Act which introduced a framework for competitive tendering procedures with respect to the provision of regional services. The 1988 Transport Policy Act also included other elements such as the separation of service provision and infrastructure. Sweden can in many aspects of railway reform be seen as forerunner in a European context. Subsequently, other potential operators have from 1993 been invited to take part in the tendering regarding service contracts with the state for the unprofitable part of the main lines (interregional passenger services). Currently, SJ's exclusive right for passenger traffic is therefore limited to the profitable services among the interregional traffic. Currently, a number of new companies are now providing rail passenger services in addition to the ones provided by SJ. For example in the case of regional services, the Citypendeln (CP) consortium (owned by French VIA-GTI (90%) and Swedish BK-Tåg (10%)) is from January 2000 to June 2005 responsible for operating commuter train services in the Stockholm area for Storstockholms Lokaltrafik (SL). CP replaced SJ as the operator of these services. The SL commuter services represent about 15% of Swedish train traffic measured in terms of passenger kilometres, see Hylén (2000). Another newcomer to the Swedish rail passenger market is Svenska Tågkompaniet, which in late 1999 was awarded contracts for regional services in Gävleborg and Uppland counties. As examples of alternative operators for the interregional rail market Tågkompaniet and BSM were, together with SJ, awarded contracts in May 1999, see Hylén (2000).

These examples demonstrate that as a result of the introduction of competitive tendering processes new entrants are emerging in both the regional and interregional rail markets. The new entrants include domestic companies as well as international consortia, highlighting the need for reforms of the passenger rail market across Europe in order to create a level playing field. In 2000 operators other than SJ provide nearly one third of rail passenger kilometres. This indicates a sharp decline in SJ's share of the rail passenger market over the last 2-3 years. The present situation with respect to the profitable part of the interregional services in Sweden, where SJ has an exclusive right, is likely to change implying some form of regulatory reform. As such the proposed EC Directive to replace Directive 95/19 refers to "…charging and capacity-allocation schemes should permit equal and non-discriminatory access for all undertakings" indicating the aim towards removal of exclusive rights with respect to all types of rail traffic. Furthermore, expected changes in relation to Regulation 91/1893 (concerning the concept of public service obligation for rail, road, and inland waterway) are likely to involve increased reliance on competitive tendering with respect to passenger services including rail based transport. These

policy developments are supported by a recent decision in the Swedish Parliament in May 2000 concerning reforms of the railway industry in Sweden. In particular, it was decided to change the status of SJ from a state enterprise to several limited companies. The change was implemented on 1st January 2001 where the SJ Group was replaced by: SJ AB (SJ resor); Green Cargo AB (SJ Cargo Group); Jernhusen AB (SJ Fastigheter); Euromaint AB (SJ Teknik); TraffiCare AB (SJ Terminalproduktion); and Unigrid AB (SJ Data). Furthermore, changes will be implemented concerning the framework used for the part of the interregional rail traffic which is provided by operators other than SJ. A review of other aspects of rail passenger traffic is also envisaged, e.g. the regulatory framework for provision of interregional services in connection to the Öresund Fixed Link as well as other services. The possible changes to the regulatory framework in relation to rail passenger traffic in general, and the commercial part of the traffic in particular, can involve a variety of different elements.

5.1 Characteristics

Terms and conditions for traffic rights
Until the decision by the Swedish Parliament in 2000 SJ had an advantage compared to new entrants winning contracts through competitive tendering for the non-profitable services as the traffic right could be returned to SJ when the contract had expired, if SJ could demonstrate that it could provide the services on commercial terms.

Competition with regard to time and place
Overall, the main form of competition involves off-the-tracks competition through competitive tendering for regional services and non-profitable interregional services. One exception is the line Central Stockholm-Arlanda Airport where SJ faces competition from the newly opened A-Train services.

5.2 Implications

Important effects of the Swedish railway reform relate to the improved possibility for new entrants on the rail market. The new entrants were initially limited to the regional services but since 1999 operators other than SJ have been successful in winning contracts in competitive tendering on the interregional services.

In Table 6 a number of performance indicators are presented concerning the Swedish Rail Industry for the period 1980-1997.

Table 6. Performance indicators for the Swedish rail industry

	1980	1982	1984	1986	1988	1990	1992	1994	1997
Total route km	11377	11760	11637	11236	11076	10081	9846	9661	11168
Passenger km (m)	6787	6381	6483	6152	6081	6076	5234	5906	6286
Freight ton-km (m)	15914	13644	16944	17471	17774	18441	19202	18591	18126
Passengers (m)	77.1	75.4	77.7	73.0	74.3	77.4	76.6	94.1	104.1
Freight tons (m)	53.6	40.2	47.3	52.7	52.4	53.0	51.5	54.0	53.8
Ratio of passenger fares to freight rates	1.33	1.52	2.05	1.96	2.48	3.84	5.36	4.19	
Staff	32766	32737	31859	30074	33828	28458	24943	21856	
Ratio of total wages to total revenue	0.94	0.96	0.87	0.78	0.95	0.78	0.70	0.73	
Total locomotives	1215	1214	1208	1225	1212	1062	974	811	726

Source: World Bank Railways Database, 2000
http://www.worldbank.org/html/fpd/transport/rail/rdb.htm

Table 6 indicates a significant improvement in productivity with substantial reductions in staff while increasing number of passengers carried and maintaining freight tons transported. In this period the dominant operator was SJ.

6. Denmark

In comparison with the approach to deregulation and competition for the rail market adopted in Sweden and United Kingdom a more gradual approach has been adopted in Denmark. DSB is still at present (July 2002) providing the vast majority of passenger rail services on the basis of five year contracts between DSB and the Ministry of Transport. However, from 1 January 2000 DSB lost its exclusive right to provide rail services on the State's rail network. The Minister of Transport put out for tender up to 15% of the total train kilometres (outside the Copenhagen commuter services (S-tog)). This tendering was won by ARRIVA and its operations. In this way DSB will face competition from other passenger rail service operators. Apart from DSB there are 13 so-called private railways providing local or regional passenger services. The term private railway is not completely valid as the majority of shares are held by national, regional and local authorities (around 90% of share capital). From January 2001 the responsibility for the private railways has been transferred from the State to regional authorities, where the regional authorities will be responsible for both service provision and infrastructure (i.e. an example of a vertical integrated rail mode). Since 1993 a number of initiatives have transformed DSB. DSB has moved from a Directorate under the Ministry of Transport to an independent public enterprise operating as a publicly owned limited company. In 1993 DSB was also a vertical integrated company with responsibility for both infrastructure and service operation providing transport services with respect to rail (passengers and buses), buses and ferries.

6.1 Characteristics

Terms and conditions for traffic rights
The infrastructure authority (Banestyrelsen) should as far as possible accommodate for the plans for service provision put forward by rail companies (companies with a license to operate rail services). If there is conflict between rail services capacity

allocation should be based on the following principles: (1) first priority is given to public service traffic (passenger services); (2) second priority is given to freight traffic using international freight corridors; (3) remaining capacity is allocated according to the expected level of train kilometres taking into account the level of previously allocated capacity such that the rail companies are guaranteed to preserve a minimum share of capacity ("grand fathers rights"). It should be noticed that the allocation of track capacity to rail companies does not imply an exclusive right for the track, although the Minister of Transport can grant exclusive rights for boarding and unboarding of passengers on specific stations and specific times.

Competition with regard to time and place
At present there is no real competition between different passenger rail companies in Denmark. However, over the next years there will be competition between DSB and alternative operators (incl. ARRIVA). The form of competition will in the main be off-track through the competitive tendering of 15% of the passenger traffic outside the Copenhagen commuter rail network. In addition, there may be some limited on-track competition since there are connections on the six routes put out for tender that will be served by both DSB and the operators winning the contracts. Furthermore, there could be competition between DSB services and services operated as open access services (although this is likely to be on a very small scale). Increasing the position of the rail mode has been supported substantial through the completion of the Öresund and Great Belt Fixed Links as well as other rail infrastructure initiatives. Other issues concern the extent to which rail operators are interested in opening services on pure commercial terms relating to the possibility to get access on equal and non-discriminating terms to the different facilities required (e.g. stations).

6.2 Implications

Tables 7 summarises some indicators of the performance of the rail industry in Denmark since 1980.

Table 7. Performance indicators for the Danish Railway Sector

	1980	1982	1984	1986	1988	1990	1992	1994	1997	1998
Total route km	2015	2015	2448	2471	2476	2344	2306	2349	2232	
Passenger km (m)	3803	4528	4420	4707	4797	4855	4600	4836	4980	5382
Freight ton-km (m)	1619	1652	1635	1791	1657	1730	1890	2008	1619	1575
Passengers (m)	130.4	135.2	134.0	145.5	143.1	146.3	142.9	142.3	144.4	148.7
Freight tons (m)	6.5	6.8	6.9	7.4	7.4	8.0	8.2	9.7	8.3	7.9
Ratio of passenger fares to freight rates	0.66	0.66	0.70	0.72	0.79	0.76	0.99	1.02		
Staff	21110	22832	22154	21437	21794	20353	20076	20044	15745[1]	
Ratio of total wages to total revenue					1.00	0.95	0.85	1.29		
Total locomotives	300	316	331	412	379	341	304	283	143	

[1] latest figures 1995
Source: World Bank Railways Database, 2000
http://www.worldbank.org/html/fpd/transport/rail/rdb.htm

The available information suggests a somewhat improved performance in the Danish rail sector with increased level of passenger kilometres between 1980 and 1998 (41.5%) combined with almost constant level of freight ton kilometres. Staff levels have been slightly reduced and the number of locomotives has also been reduced.

Rail industry structure

Until now there has not been any changes concerning the *structure* of the Danish rail industry for passenger services apart from those resulting from the structural changes of DSB. Changes in the coming years will be determined by the extent to which alternative operators succeed to win contracts in tendering as well as the scope for opening new services on commercial terms.

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