

EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT



**Regulatory
Reform of
Railways
in
RUSSIA**

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EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT (ECMT)

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Foreword

This report was prepared by the ECMT as part of a wider programme of co-operation on regulatory reform between the OECD and the Government of Russia. It was finalised following a meeting in January 2004 where senior officials from the Russian Government and the Russian Railways company discussed the reform of rail regulation in Russia with their peers from ECMT and OECD countries and with the team of experts that drafted the review. The report examines the fundamental issues of regulation and their relation with the structure of the sector and the development of competition in providing rail services. This is the first in-depth review of rail policy in ECMT member countries in the light of the Resolution on the development of European railways agreed by Ministers in 2002.

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Table of Contents

Acknowledgements	4
Chapter 1. Executive summary	9
Progress	10
Fundamental points based on OECD experience with rail reform	11
Key decisions to be made now	13
Next steps in reform	13
Conclusion	15
Notes	16
Chapter 2. Rail markets in the Russian Federation	17
2.1. Introduction	18
2.2. Transport markets	20
2.3. Railway performance	23
2.4. Geographic characteristics of the rail market	27
Notes	31
Chapter 3. The government's railway reform programme	33
Notes	38
Chapter 4. Key regulatory challenges	39
4.1. Accounting	40
4.2. Competition policy and the goals of reform for freight transport	42
4.2.1. Regulatory arrangements for the initial approach to competition	42
4.2.2. Horizontal separation into competing vertically integrated operators	48
4.2.3. Choosing the approach to competition	52
4.3. Tariff regulation and charges for the use of infrastructure	52
4.3.1. Tariff regulations	52
4.3.2. Competition and pricing for the use of infrastructure	61
4.3.3. Regulating the tariffs charged to the railway customer	67
4.3.4. Conclusions on tariffs	75
4.4. Passenger rail public service obligations and concessionary fares	77
Notes	83
Chapter 5. Railway reforms and investment	87

Annex A.	Note on non-discriminatory access to railroad infrastructure by Russel Pittman, United States Department of Justice	91
Annex B.	Lessons from the privatisation of Britain's railways by Jeremy Drew, UK Consultant	105
Annex C.	Experiences in Germany with DB Netz AG's 1998 and 2001 route pricing system by Ralf Schweinsberg, Federal Railway Office	131
Annex D.	National rail infrastructure usage charges in Italy by Franco Marzioli, Italian Rail Network (Rfi)	143
Annex E.	The new framework for access to railway infrastructure in the EU: Ensuring non-discrimination and high quality international rail services by Jan Scherp, European Commission, Brussels	155

List of Boxes

3.1	Legislative summary	36
4.1	Examples of independent rail operators in steel and oil markets	44
4.2.	Efficient infrastructure pricing	62

List of Tables

2.1.	Contributions to government income from the railways.....	18
2.2.	Headline financial indicators.....	18
2.3.	Road network of the Russian Federation, 2002	22
2.4.	Rail network of the Russian Federation, 2001	23
2.5.	Average length of haul by freight category in 2001	27
4.1.	Age of locomotives	43
4.2.	MPS regional railroad to regional railroad total freight flows (000 tons) in 2001	49
4.3.	Distribution of freight traffic by class (domestic traffic and traffic to and from ports).....	56
4.4.	Additional distance taper for Class I commodities	56
4.5.	Tariffs for trains of shipper-owned wagons and locomotives as a proportion of the tariff for a standard RZhD railway shipment (%).....	60
4.6.	Choices in recovering fixed costs.....	65
4.7.	Infrastructure costs as a proportion of total costs.....	68
4.8.	The impact of controlled competition on performance of public transport systems ...	78
4.9.	MPS passenger operations in 2001	79
4.10.	MPS regional railroad total: MPS regional railroad to regional railroad total long haul passenger flows (000 passengers) in 2001	81
C.1.	Basic prices	136
C.2.	Product factors	138
C.3.	Weight classes	139
D.1.	Value of the section/node portion according to tariff area	149
D.2.	Unit value (€/km) of the km/min portion on the core network according to track characteristics.....	149
D.3.	Unit value (€/km) of the km/min portion in nodal sections	150

List of Figures

2.1. Russian railways in 2003	19
2.2a. Freight transport in billion t-km	20
2.2b. Freight transport in million tonnes	20
2.3. Passenger transport in billion passenger kilometres	21
2.4a. Inter-city services	21
2.4b. Urban and suburban services	21
2.5. Modal shares of fixed total capital investment in inland transport	23
2.6. Per cent of rail passenger traffic to total rail traffic	24
2.7. Rail traffic density, 1999	24
2.8. Freight t-km trends on CIS railways	25
2.9. Rail passenger traffic in the Russian Federation	25
2.10a. Rail freight traffic by commodity in billion t-km	26
2.10b. Rail freight traffic by commodity in million tonnes	26
2.11. Average traffic density on the regional railways	27
2.12. Origin to destination coal movements over 1 mt per annum in 2001	28
2.13. Distribution of coal traffic by length of haul	29
4.1. 1999 financial performance according to international accounting standards	40
4.2. Two competing vertically integrated rail freight companies for western Russia	51
4.3. Could the regional railways be reorganised to provide a mix of integrated competitors and open access for rail freight?	51
4.4. Distance taper applied to all classes of freight	55
4.5. The share of transport costs in commodity prices is a key consideration in setting tariffs	57
4.6. Tariff charges for operators using private and RZhD rolling stock	59
4.7. Allocated distribution of average railway costs	60
4.8. US rail freight revenue	71
4.9. Freight modal shares in the US	71
4.10. Productivity in US railroads	71
4.11. Average US freight and airline tariffs	72
4.12. US railroad freight tariffs in 2001: Revenue/ton-km (US cents) by commodity and ratios of revenue to variable cost	73
4.13. Freight tariff comparisons: US and Russia	73
4.14. Current financial flows and a model for the future	82
A.1. Marginal cost pricing	94
A.2. Fully allocated cost pricing	95
B.1. Structure and relations within privatised rail industry in Britain	107
B.2. Increase in passenger and train km by type of operator (1997/8-2001/2)	109
B.3. Annual payments to franchised passenger operators (£ million) 1998-2002	113
C.1. Figures: Summary of train path pricing system 2001	139
C.2. Breakdown of modular train path pricing system	139
C.3. Line categories	140
C.4. Train path products	140
C.5. Train path products	140
C.6. New products	141
C.7. Price setting	141
C.8. Integrating loads: threshold value 1 200t	142
C.9. Special factors	142
D.1. Cost covered by the charge amount	150
D.2. Access charge	150
D.3. Network breakdown	151

D.4. Access charge	151
D.5. Breakdown of the charge amount.....	151
D.6. Track section/node portion.....	152
D.7. Distance-based portion.....	152
D.8. Time-based portion.....	153
D.9. Determining the variable portion of the line.....	153
D.10. Determination of the variable portion of the note	153

Chapter 1

Executive summary

The Russian Railway system¹ is in the process of rapid legal, organisational and regulatory reform. This paper is based on a series of discussions with the Government on the reform plans and the progress in implementing reform. The conclusions are not intended to be interpreted as requirements or instructions on the next steps in the process. They instead aim to raise questions where, from observing difficult reform issues in other countries, the team believes further refinement might help the Russian regulatory reforms progress more effectively and in some cases avoid costly mistakes made in other countries. With these suggestions in mind, only the Russian authorities are in a position to judge what the best course of action will be in making the right trade-offs between valid, but competing, objectives.

Progress

Good progress has been made in developing a comprehensive program of reform for the Russian Railways. Incorporation of the Russian Railways as RZhD OAO on 1 October 2003 marked the first milestone in the implementation of the program. The Laws adopted set out a firm direction for reform whilst acknowledging the need to retain flexibility in the structural changes to be made as the market develops and responds to reform. The programme has been designed to avoid economic shocks to this key section of the economy. Progress is favourable compared with the planning and speed of reform in many western railways. Some results are already evident, with significant investment in rolling stock by private operators following creation of the necessary legal framework and modifications to rail tariffs.

The team believes it is critical that the momentum for change developed so far be continued and strengthened. More emphasis should, however, be placed on clarifying the stated objective of enhancing **competition** (both intra-rail and intermodal) and its relation to **regulation**, both of infrastructure access charges and of rail tariffs, and the **structure** of the rail industry in Russia. The objectives, and the linkages between them, must be developed in a coherent way, or they will conflict with each other and defeat the overall goals of reform.

Major spurs for reform, clearly identified by the Government, are severe under-investment in infrastructure and rolling stock since 1990 that may begin to limit the railway's ability to meet transport demand and threaten the financial performance of the railway, together with the cost of supporting passenger services. The team foresees that the rapid pace of change in the structure of Russia's economy and in the markets the railways serve, and the growing competition from road transport to carry higher value freight, will compromise the ability of the railways to contribute to the Government's regional and national economic development policies.

The response of the government to financial weakness has been a determination to improve cost effectiveness by separating non core activities from the railway, contracting for public service requirements and creating legal and tariff frameworks for shippers and industrial customers to invest in private wagons and locomotives. In addition, the reform plan provides for the creation of new general freight carriers to compete with the existing,

state-owned freight carrier. Further measures will be required to promote this and other kinds of competition and the team believes that enhanced competition should occupy a more central place in the priorities of the reform program. Experience in other countries shows that monopolies rarely maximise efficiency and are slow to innovate and provide the service that customers require.

Fundamental points based on OECD experience with rail reform

The regulatory framework adopted for the railways will be critical in determining the performance of the system both financially and in terms of quality of service. **Tariff regulation** that continues to limit the scope for both adapting to market pressures (responding to competition from road haulage especially) and pricing services according to the ability of customers to pay will damage the railways. And although geographically uniform tariffs may appear to promote regional development objectives, they place the railways at a severe disadvantage in competition with other freight carriers, such as trucks, that have the flexibility to charge tariffs specific to each local market.

Similarly, unless the **prices charged by RZhD to other carriers**² for using state owned infrastructure are regulated in a way that maximises the control that these licensed train operators have over their costs, the competition envisaged in stage one of the reforms may not develop fully. An effective mechanism for rapidly resolving cases where discrimination is alleged in the provision of **access to infrastructure** is also essential for this kind of competition. The Antimonopoly Ministry may need additional resources to cope with an increase in its already heavy case-load, or a **specific regulatory agency** may need to be created to manage the increasingly complicated regulatory issues that are likely to arise. Markets where competition fails to develop are likely to see quality of service decline and traffic lost.

The **burden of regulation** on the Government, in terms of financial resources, expertise and institutional capacity, varies greatly with the type of regulatory framework adopted. Regulatory systems have been most successful when, through the design of the industry structure, they both reduce the scope of prescriptive regulation and reduce the need for intervention by regulatory authorities. Such systems rely on **competition in place of regulation**. The more complicated, more prescriptive frameworks, where competition depends primarily on operational regulation rather than the competitive structure of the industry, have been adopted where government-financed passenger services dominate the rail system or where external constraints limit the freedom to choose industry structure, as for example in the case of regulation to promote the development of a single market in rail services in the European Union. The limited public resources available in Russia strongly argue for adopting a structure for the rail industry that reduces the need for regulatory intervention and minimises the burden on Government. This would argue for restructuring the rail system to create competition between vertically integrated freight rail companies where feasible.

The potential weakness of such a system would be in directing adequate investment to infrastructure to sustain the largely government funded operation of passenger trains. Particular regulatory attention would also need to be directed at ensuring sufficient priority in the dispatching of passenger trains to maintain the levels of service required and ensure value for money for the public support provided for passenger train operations. Innovation, rather than adoption of any one existing model among OECD countries, would be required in

terms of the ownership of integrated railways (with perhaps a mix of public and private ownership) and the application of European style public service obligations to a North American style system of competing integrated railways.

Whatever approach is adopted, the key regulatory task is to encourage both investment and efficient operation of the railways, in line with the government's prime objective of reducing costs. To this end it will be important that the regulators have both adequate information and economic expertise to make judgements on issues such as tariff structures and access charges that are fundamental to efficiency. **The regulatory authorities should be making economic assessments**, not simply overseeing application of the letter of the law.

A **regulator** will be required to protect the public interest from an economic and commercial viewpoint. This body should be independent in its organisation, funding decisions, legal structure and decision-making from the infrastructure manager or any carrier. It should be an independent agency of the government, free of potential conflicts of interest that might arise were it to also have responsibilities for regulating prices that are themselves affected by rail charges (such as coal) or have a large impact on rail costs (such as electricity). The principle role of this regulator, under the proposed structure, will be to ensure that infrastructure access is fair and charges appropriate. This is a complex task, given the conflicting objectives encompassed in government policy.

The results of Government decisions, discussions and negotiations can only be as good as the **quality of the information** on which they are based. Whatever the objectives of reform for the Russian Railways, it is vital that more accurate information be produced and made readily accessible to all railways, to their customers and to the public at large. The last few years have seen remarkable progress in the publication of accounting data but some rail traffic and operating information that would be public in most OECD countries remains restricted in Russia: restriction of information severely reduces the quality of analysis and debate on crucial issues.

Transparent accounts of costs and revenues presented according to International Accounting Standard methodology by line of business are required, identifying in particular losses and subsidies. This is essential if the economic impact of reforms is to be understood. It will also be needed to monitor the successes of reforms, and present them to the Duma, the press and the public, especially when criticisms and problems arise. As well as a vital next step in Russia, this is a universal lesson from reform in other countries.

Such transparent accounts are also essential to prepare the way for **replacing cross-subsidies** with direct financing for loss making passenger services. The team recognizes the work done for MPS by Deloitte and Touche³ on the losses associated with social services and the need for more transparent and IAS compliant accounting for MPS, and encourages RZhD to continue the effort to develop line of business based, IAS compliant reporting. RZhD's intention to begin publishing such accounts in 2004 is very welcome. The government will need to develop standard sets of data that it requires all carriers to submit in order to enable it to regulate the industry effectively.

It is important to prepare **public expectations** as to the results of the reforms. The public should not be promised unrealistic improvements as this will surely lead to dissatisfaction with the eventual results. The inevitable trade-offs between different goals have to be explained and discussed throughout the process of reform. Making good and

detailed data available to the public will also improve public understanding of the reform process.

Key decisions to be made now

Passenger rail transport should be separated rapidly from the rest of the system. At the beginning, this might commence with a financial separation through separate accounts for the various passenger functions (including payment for infrastructure access and use): this can progress to institutional separation, with separate companies for the various intercity and suburban services. The assets that should go to the passenger companies should be established and the cross-subsidies from freight to passenger services ended. For loss making suburban services, **contracted public service obligations** should be developed, as practiced in the European Union. Direct government funding might be introduced, as with Amtrak in the USA and Via in Canada, for the long haul, intercity passenger companies, though it is possible that with pricing flexibility and direct central or local government support for the various privileged passengers required for social purposes, the intercity passenger services may require little or no additional support.

Moreover, everywhere it has been tried, **involving local governments** in planning and funding local services improves the planning and selection of which social rail services to maintain and by how much to support them. Even channelling only a small part of the finance needed through the local authorities has a big impact in making their demands for public services more realistic and improving the efficiency of the services organised.

The trade-offs to be made in achieving the objectives of reform need to be more clearly identified for all of the government bodies involved in reform. There is an important trade-off between *a*) improving the economic performance of the railway system itself (the stated goal of the reform process) and *b*) using the railway to promote **social policies and regional development** policies (a stated goal in the methodology of development of the freight tariff schedule). International experience suggests that social and regional development goals should be addressed by direct government support and not through manipulation of the tariff schedule by creating favoured commodities and regions at the expense of other commodities and regions. The economic costs of social and regional development goals need to be identified accurately and transparently. There is a major risk of damaging the railway when these goals are hidden rather than addressed by direct financial support and other government measures.

Next steps in reform

For the next steps in reform it is essential to clarify and define the goals of introducing **competition**. To date the railway itself has led many aspects of the reforms and developed the concepts for the introduction of competition in the sector, albeit directed to introduce competition and provide for non-discriminatory access to infrastructure by the Antimonopoly Ministry. With the incorporation of RZhD stronger leadership from government will be required – no for-profit company has the incentive to create competition for its own services. Government responsibilities for the development of rail competition policy and law⁴ now need to be clarified. The laws already adopted stress the importance of competition, but competition can take different forms and serve different purposes. What kind of competition is to be encouraged:

- Rail versus truck and barges?
- Rail versus rail – if so where?
 - ❖ among integrated freight/infrastructure companies on parallel lines;
 - ❖ among integrated freight/infrastructure companies competing to serve customers at commonly served points (often called “source” competition); or
 - ❖ among competing carriers running trains on the same line?

It will also be important to clarify the priority of the competition objective relative to other objectives. If competition is critical, the structure of the industry and the formulation of access charges have to be set first and foremost in ways that enable competition. In markets where a significant degree of competition is achieved, either intermodally or between rail companies, then the need for, and the approach to, regulation can and should change accordingly. For example, it is not appropriate to regulate end-user rail tariffs in parts of the market where there is strong competition from road haulage. Also the need to regulate access charges will be reduced if there is competition between vertically integrated operators.

As the goals for competition become more clearly defined, it will be essential to review the compatibility of the **tariff system** with those goals. The plans for **structural reforms** will also have to be reviewed to ensure all three components: competition, regulation and structural changes are mutually supportive, not conflicting. The next steps in reform should focus on the coherence between these three parts of the reform program to make sure that each supports the other.

Potential inconsistencies arise in the current formulation of charges in the case where a shipper or operator wishes to provide private wagons or in the case where the shipper or operator wishes to provide both locomotives and wagons and pay only for the use of the infrastructure. Procedurally it is possible to calculate the tariffs for infrastructure usage alone. To these are added the charges for use of railway locomotives (if used) and then of railway wagons (if used).⁵ Ancillary services, such as loading, insurance or marketing, can be subtracted when these are also provided by the shipper or by an independent carrier. As discussed in more detail later in the report, the net result is a charge for the use of infrastructure that is higher than would result by following the approach typical in the European Union that establishes **track access charges** on the basis of costs from the bottom up. Instead of being based on infrastructure **costs**, Russian infrastructure access tariffs are based on commodity class and other demand factors. This may well increase the ability of the infrastructure company to cover its total costs, but there is a risk that an infrastructure charge that is higher than the economic costs directly attributable to infrastructure use will act to limit the ability of new carriers to enter and compete with the freight carrier operation of RZhD, and it could severely limit the ability of all rail freight carriers to engage in flexible, tariff and service-based competition with trucking companies. Moreover, in some cases (as discussed below, this occurs primarily in higher value commodities over longer distances), charges are actually higher for shipments in private wagons than in railway-furnished wagons, which may act to limit the cases in which shippers or operators will invest in new wagons.

In Russia the Law on Natural Monopolies identifies sectors of the economy where tariffs are to be regulated. The railways fall under this category. Nevertheless, strong competition already exists in some markets. Competition from road haulage for higher value freight is developing rapidly in European Russia particularly over distances below

400 km. Niche rail operators carry more freight than RZhD in some markets. For example own-account transport companies carry 60% of the oil carried on the national rail network. In markets demonstrating competition, rail end-user tariffs ought to be free of regulation. If tariffs remain regulated in markets where rail faces competition from other modes, the railways risk long-term insolvency in the same way that US railways came close to bankruptcy in the 1970s. If tariffs are not freed in markets where rail-on-rail competition develops, some of the benefits of competition will be foregone, and prices to shippers will be higher than they need be. Niche carriers, which are free to negotiate shipping rates, currently charge shippers substantially more than RZhD's regulated tariffs (in return for better assurance of rolling stock availability). **Freeing tariffs** in these markets would inevitably require a new approach to setting access charges based more directly on costs.

The current approach to introducing **competition** in the railways is to create the legal framework for the emergence of new carriers to compete with the RZhD freight carrier on infrastructure owned by RZhD. Fostering the emergence of general freight carriers that can actually compete with vertically integrated Russian Railways will be demanding on the regulators if it is to result in more than the development of specialised niche operators in limited geographic markets. Before embarking on the major task of establishing a regulatory system that promotes competition between carriers with the structure proposed, the team considers that further thought should be given to **reducing the regulatory burden** by either creating a vertically separated structure with full organisational separation of infrastructure management from train operations, with cost-based access charges and without dominance by a single train operator or by separating the railways horizontally and establishing vertically integrated companies that would compete with one another.

Conclusion

The urgent need is to **continue the reforms**. The profound transformation of the railways over the last two years has been achieved in a remarkably short time and positive results in terms of investment, productivity and traffic are already apparent. Stalling reforms now would, however, arrest the recovery. The risks of delay are greater than the risks of pushing through the reforms. Given the rapid pace of economic development in Russia, allowing the railway reforms to lag behind could be very damaging both to the rail system and to the national economy. Planning and analysis for the next stages of reform should commence as soon as possible. Questions that need immediate attention include:

- In which areas of Russia, and for what commodities, is rail versus rail (as opposed to truck versus rail) competition needed?
- How quickly should the new tariff schedule (10-01) be reviewed and from what points of view? Does it encourage, or limit, the entry of new common carriers that will compete with RZhD across the full spectrum of general freight? Will it permit adequate pricing flexibility for rail freight carriers to compete with trucking companies for high value freight?
- Will there be line versus line competition in Western Russia? If so, how should the railway be divided and restructured. What data are required to design a system of competing railways that minimises the need for detailed regulatory intervention? Will the competition be on parallel track, at commonly served points, or both?

- What is the future significance, if any, of the 17 traditional regional railways? Should they be recombined into a smaller number? Should the borders be redrawn to facilitate competition and reduce costs?

Though RZhD will need to prepare for the next stages of reform with analysis of the potential options, it cannot be expected to lead the process of introducing competition. This can only be done by the Government and its regulatory agencies. The priority for RZhD will be in adapting its methods of analysing costs⁶ to a market environment. Following the separation of RZhD from MPS in September 2003, the respective roles of the Federal Government Railway Commission (chaired by Vice Prime Minister Khristenko), the Ministry of Railways, the Ministry for Economic Development and Trade, the Antimonopoly Ministry and the Ministry of Transport would benefit from clarification, particularly in relation to leading reforms aimed at promoting competition in rail markets.

Notes

1. In the past, the Russian Railway system has been called the Ministry of the Means of Communication (MPS). The system was separated in 2003 into a number of components, of which a Ministerial component along with a railway operating component (Russian Railways or RZhD OAO) are the most important. In this paper, MPS is used to refer to the rail system that existed prior to the split. RZhD refers to the new company established on 1 October 2003 to own and operate rail infrastructure, freight and, at least temporarily, passenger services in Russia.
2. The 2003 Federal Law on Railway Transport provides for the licensing of “carriers” to compete for business with RZhD across the board in addition to the approval of “operators” that transport freight on an own-account basis.
3. Deloitte and Touche, and Scott Wilson Consultants, “Report of the Consortium of the Advisers on Analysis of government spending in the railways transport of Russia”, Moscow, 2002.
4. As opposed to exercising powers under existing laws.
5. It is also possible to calculate charges for access and wagons with shipper-furnished locomotives.
6. Data on approximate marginal costs will be most relevant.

Chapter 2

Rail markets in the Russian Federation

2.1. Introduction

The railways accounted for 5% of Federal Government income in 1999, the last year for which complete data was available, and probably a similar proportion of regional and local government income. This is more than any other industry, including such large export earners as Gazprom (see Table 2.1). Freight operations show a book “profit”¹ that covers losses in passenger services. The national railway is the largest of the state-owned monopolies in Russia with 1.2 million employees and assets amounting to between 4 and 15% of all assets in the economy (see Table 2.2).

Table 2.1. **Contributions to government income from the railways**

	Million roubles				
	1998	1999	2000	2001	2002
Federal budget income	302 386	611 710	1 056 000	1 593 978	2 204 726
<i>of which: tax</i>	<i>235 984</i>	<i>509 507</i>	<i>915 552</i>	<i>1 460 398</i>	<i>2 035 598</i>
Regional and local budget income	n.a.	n.a.	789 888	1 512 850	1 896 943
<i>of which: tax</i>	<i>311 300</i>	<i>493 100</i>	<i>647 295</i>	<i>884 568</i>	<i>1 088 980</i>
Total government budget income	n.a.	n.a.	1 845 888	3 106 828	3 921 669
Total payments to government from railways	42 932	62 268	60 534	74 205	95 843
Payments to federal budget	8 273	15 486	17 238	27 372	26 196
<i>Share of federal budget income</i>	<i>3%</i>	<i>3%</i>	<i>2%</i>	<i>2%</i>	<i>1%</i>
Additional off budget transfers to federal government	10 892	14 546	n.a.	n.a.	n.a.
Payments to regional budgets	11 048	14 168	19 194	22 712	31 421
<i>Share of regional and local budget income</i>	<i>n.a.</i>	<i>n.a.</i>	<i>2%</i>	<i>2%</i>	<i>2%</i>
Additional off budget transfers to regional government	1 827	3 520	n.a.	n.a.	n.a.

Source: Ministry of Finance and communication from MPS.

Table 2.2. **Headline financial indicators**

		Euro	Share of total for Russia (%)	Source
Employment in core business, 2001	1.2 million		2	Russian Statistics
Investment, 2001	123.9 billion roubles	5 billion		Arthur Andersen
RZhd net assets (replacement value of fixed assets), 2003	1.5 trillion roubles	50 billion	8	RZhd

Source: *Transport and Communication 2002* and *Russian Statistical Yearbook 2002*, Russian Statistics Office; Audit Report, Arthur Andersen, 2002.

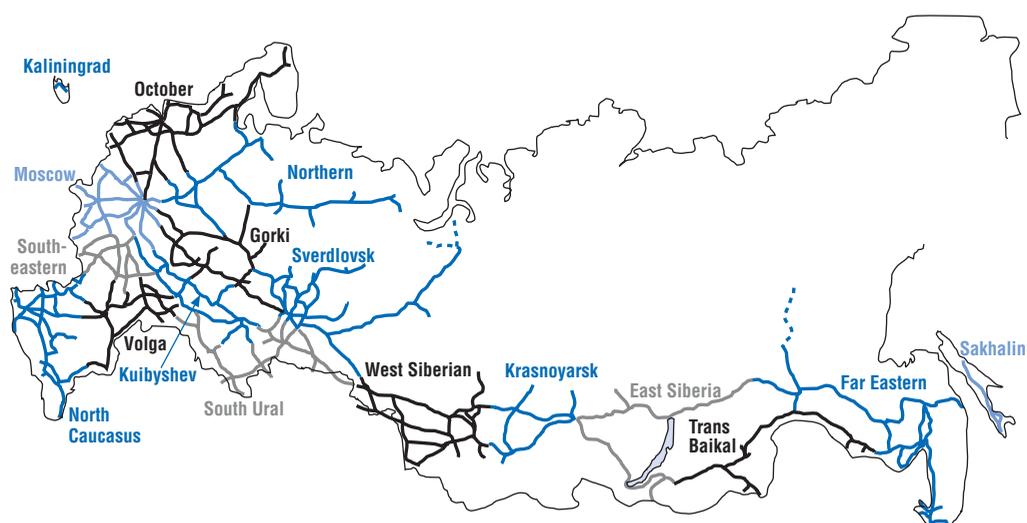
MPS has traditionally been used as an important tool of regional development policy, supporting the development of primary industries in Siberia for example. One of the main purposes of tariff policy has been characterised by the Government as “bringing Vladivostok closer to Moscow” in the interest of national unity. Equally MPS has been a key

tool for industrial policy. Tariffs for rail freight transport are differentiated to moderate the delivered prices of the products of factories that process materials with low value but high transport costs. The cost of transport for these industries is supported from revenues from the transport of higher added value products. Support has been provided above all from higher tariffs for the transport of imported goods, and goods and raw materials for export through the ports or through overland rail connections. The railways also support social policies protecting lower income groups. 50% of all suburban rail passengers travel under discretionary fares (for pensioners, students, etc.). Thus railway reform is intimately linked with reform in other key areas of Government policy.

The railways of the Russian Federation are for the most part owned and operated by the State-owned joint stock company Russian Railways, RZhD OAO (РЖД OAO). The company is vertically integrated, both managing infrastructure and operating freight and passenger train services. The assets of the railway, valued at Euro 50 Billion, were transferred from the Ministry of Railways, MPS (MIIC), to RZhD in September 2003 and RZhD began operations on 1 October 2003. The President and Management Board of RZhD report to a Board of Directors² chaired by Vice Prime Minister Khristenko and comprised of senior representatives from the Ministries of Finance, State Property, Railways, Transport, Economic Development and Antimonopoly and representatives of the Government's and President's Administrative Offices. Under the company's Charter no more than a quarter of the Directors can be drawn from the Management Board, and currently only the president of RZhD sits on the Board of Directors. The Ministry of Railways retains Government railway functions and will eventually be combined with the Ministry of Transport.³ The Ministry of Transport submitted a draft Transport Strategy for the Russian Federation to the Government for approval in October 2003 and this will provide the basis for policy across the transport sector once approved.

The industry is organized into 17 regional railways closely coordinated by regular meetings of their directors, who report to the President of RZhD. Between 1975 and 1992 metro systems were also run by the railways, but in 1992 responsibility for them was transferred to municipal governments.

Figure 2.1. Russian railways in 2003



Source: Louis S. Thompson, World Bank.

In addition to the federal railways, around 8 000 km of branch lines are owned by industrial railway entities separated from MPS between 1992 and 1995 and subsequently sold, usually to the industrial plants served by the lines. These concerns number 100 to 120, own locomotives and wagons and carry freight to and from main railway lines for around 5 000 clients. A small number of other large industrial concerns have built their own branch lines.⁴ An increasing part of the freight wagon fleet is owned by such concerns and by some other large rail customers (14% in 2003). In most cases the rail operations are run as a division of the industrial concern for its own transport needs rather than as a rail company marketing freight services to clients on the open market.

2.2. Transport markets

Rail accounts for over 80% of total freight ton-kilometres in the inland transport market, although road haulage lifts six times the tonnage of the railways. East of the Urals, rail holds a near monopoly on freight transport but in European Russia road haulage already accounted for 40% of tkm in 2001,⁵ and the trucking share appears to be growing in line with highway improvements. Transport markets are changing rapidly and competition from road haulage increasingly limits the market power of the railways in European Russia. Inland waterways account for only around 5% of freight tkm and are not expected to increase this share due to the natural alignment of rivers generally north-south, against a general east-west flow in traffic, and problems of freezing in the winter and falling water levels in many rivers. Rail is important in international trade, particularly in serving the country's ports.

Figure 2.2a. **Freight transport in billion t-km**

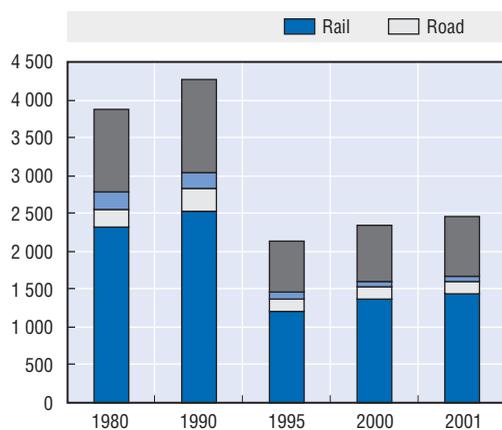
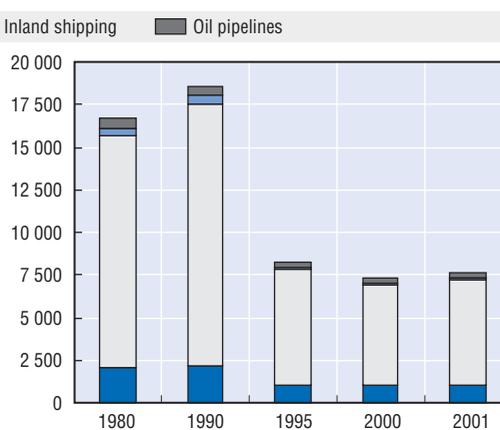
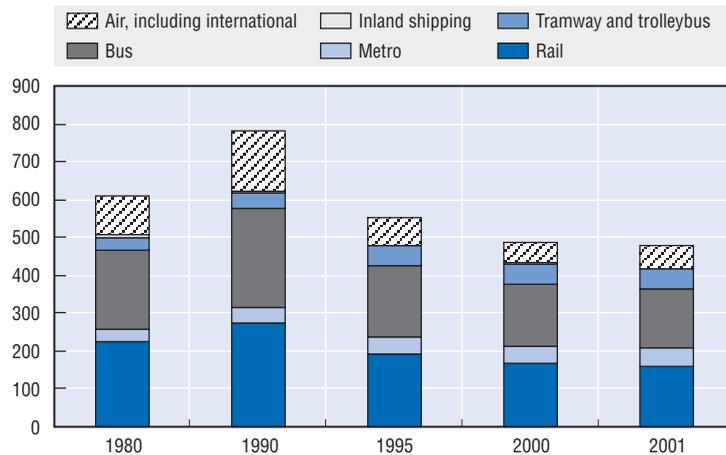


Figure 2.2b. **Freight transport in million tonnes**



Source: *Transport in Russia 2002*, Russian Statistics Office.

Rail and metro services account for around the same number of passenger kilometres in the national transport market as busses and trams. Whilst rail services are an indispensable part of mass transit systems in the major cities, rail seldom holds real market power except, perhaps, in a few major urban areas such as Moscow. In urban and suburban passenger markets rail and metro account for a third of passenger kilometres, though only 3% of passengers carried. Buses account for the highest share in both cases.

Figure 2.3. **Passenger transport in billion passenger kilometres**

Source: *Transport in Russia 2002*, Russian Statistics Office.

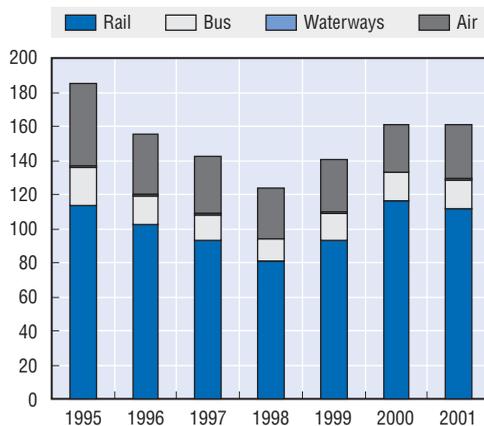
In the inter-city and long distance domestic passenger market, rail accounts for 70% of passenger kilometres. Crisis in the domestic airline industry, as it adapts to world market prices, has attenuated competition so far but the cost of domestic air tickets has fallen sharply in relation to average incomes. As incomes grow, airlines are expected to increase their share of the rail-air market split from their current 20% share.

Car use in these markets is not recorded in official statistics. Car ownership, however, is rising rapidly, at around 9% per year. There are currently around 170 cars per 1 000 head of population. Rates in Western Europe are generally over 3 times this level. This decade is expected to see around a 65% increase in the number of cars in circulation.⁶

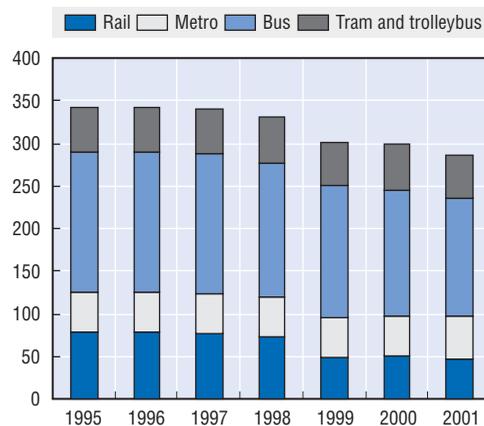
Forecasts for the development of transport markets are difficult to make in an environment that has been unpredictable over the last decade and in which the railways and other key sectors of the economy are embarking on major regulatory reforms. The

Figure 2.4a. **Inter-city services**

Billion p-km

Figure 2.4b. **Urban and suburban services**

Billion p-km



Source: *Transport in Russia 2002*, Russian Statistics Office.

behaviour of joint stock companies in responding to market pressures is likely to be different from that of government departments, with a stronger emphasis on maximizing financial returns.

In freight markets, the Ministry of Transport sees medium to long distance transport of raw materials and bulk flows of industrial goods between factories and ports as the markets where rail offers the highest efficiencies. Current freight flows are influenced to quite a large degree by the structure of regulated tariffs, which impose much lower tariffs on long distance transport of raw materials than on the transport of higher value manufactured goods. RZhD calculates that the low tariffs on bulk traffic are just sufficient to cover marginal costs, although it is not clear that this will be the result when the company's costing tools are refined to analyse data tailored to a more market orientated environment and based on IAS standards. Adaptation of freight traffic costing models deserves very high priority in Russia, both for freight management and for regulatory purposes. As competition from road haulage for the more profitable rail freight traffic grows, the cross-subsidies to passenger services will come under pressure. The ability of the railways to adapt to these pressures will in large part determine how rail freight transport markets develop over the medium and longer term.

In passenger markets, competition from airlines is expected to strengthen in the long distance markets as already noted. In shorter distance markets the dominant presence of rail is conditioned by subsidies to mainly loss-making suburban services. Cross-subsidies from freight revenues have supported these services to date. As competition from road haulage reduces the income available, there will be increasing pressure to cut services unless government finds ways to channel resources through taxes and explicit financial transfers.⁷ In some, though not all circumstances, buses may provide these services at lower cost. Rising car ownerships levels will have a major impact on this market along with urban planning policies and the way in which motorists pay for the use of the roads.

Investment in roads will be an increasingly important factor in competition for railways in both freight and in short and medium distance inter-city passenger markets. Highway investments averaged USD 7 billion per year between 1995 and 2000 and were valued at 1.5% of GDP in 2002 (having been as high as 3.5% of GDP) but have been outstripped by growth in the number of vehicles. Investments are most urgent in circular routes around cities developed traditionally along radial highways. The biggest single investment in recent years has been the completion of the trans-Siberian highway with the final section in the far East to open in 2004.

Table 2.3. Road network of the Russian Federation, 2002

Total highway network	902 000 km
<i>of which:</i>	
Company roads (gas, logging, etc.)	330 000 km
Federal roads	47 000 km
2 × 2 lane roads	3 000 km
Motorway standard roads	1 000 km

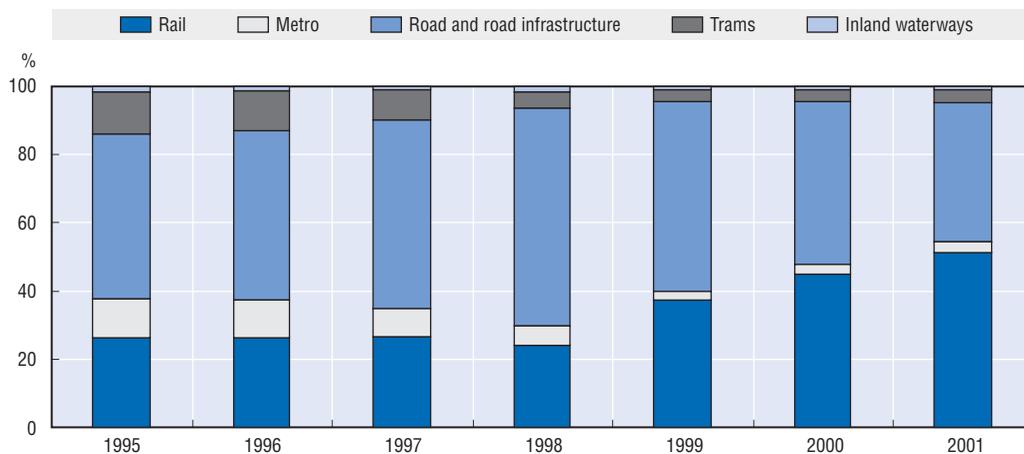
Source: Ministry of Transport, interview.

Table 2.4. Rail network of the Russian Federation, 2001

Total rail network	85 800 km
<i>of which:</i>	
Double track	36 200 km
Electrified	41 600 km
Spurs owned by shippers	11 400 km

Source: *Transport in Russia 2002*, Russian Statistics Office.

Figure 2.5. Modal shares of fixed total capital investment in inland transport



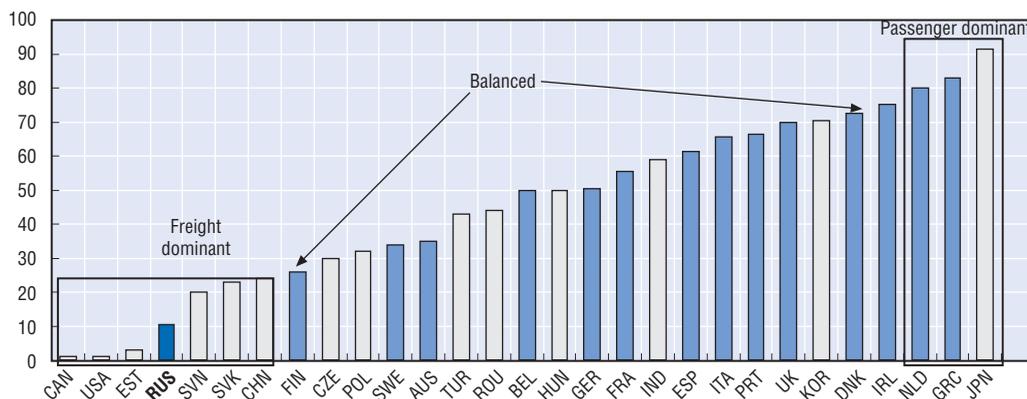
Source: *Transport in Russia 2002*, Russian Statistics Office.

2.3. Railway performance

The Russian rail system is one of the largest and most intensively operated in the world. It is the second largest in network size and only the US Class I railroads⁸ in total are larger. It is third in ton-km (after USA and China),⁹ fourth in passenger-km (after China, India and Japan), second highest in traffic density¹⁰ (after China) and second in average length of freight movement¹¹ (after the USA and equal to Canada). Russian Railways have the highest modal share of surface freight transport of any railway. 80% of track is electrified. The share of passengers as opposed to freight¹² in Russian rail traffic is very low (USA 1%, Russia 10%, China 20%, and the EU railways average around 50% – see chart below). The Russian rail system is world class by any measure of size, intensity of use or managerial and technical capability. It is clearly an asset of enormous importance to the economy of Russia, and the government also views the railway as a key defence asset. The importance of the railway is reinforced by the geography of the country (cities separated by large distances) and the harsh climate that makes all-weather road connections impossible over large parts of the territory. Population density and settlement patterns make the European and Asian parts of the system very different. Unlike European Russia, competition from road transport is unlikely to become significant for traffic on the Asian part of the system.

Rail traffic trends have been closely correlated with economic restructuring. From a peak in traffic at the end of the 1980s freight volumes had halved by 1994. Economic

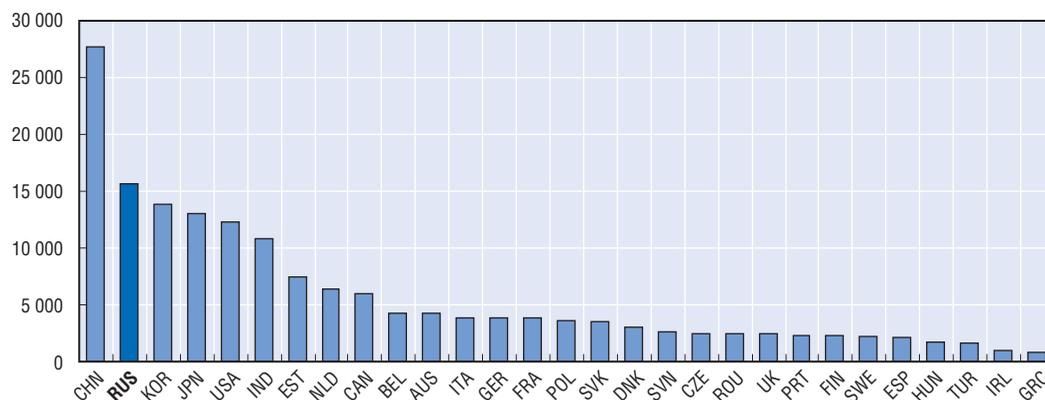
Figure 2.6. **Per cent of rail passenger traffic to total rail traffic**
 $p\text{-km} / (p\text{-km} + t\text{-km}) \%$



Note: Blue shading indicates EU railways.

Source: Louis S. Thompson, World Bank.

Figure 2.7. **Rail traffic density, 1999**
 $(t\text{-km} + p\text{-km}) / \text{km}$



Source: Louis S. Thompson, World Bank.

instability in the mid 1990s saw freight volumes fall further before starting to grow with the expansion of GDP that began in 1999. Freight volumes are now around 60% of their historical peak. As a result much of the system currently has spare infrastructure capacity. Rail passenger traffic followed a similar trend though the recent turnaround is less marked than for freight, due perhaps to growth in car traffic.

The main freight commodities carried by the railways are identified in the figures that follow. Coal accounts for the largest part of traffic (29% of t-km and 24% of tonnes carried), followed by crude oil and oil products. 22% of coal tonnage is carried distances of less than 100 km and half under 550 km. Nevertheless 20% of the total is carried distances of between 3 000 and 5 000 km. Comparing the figures for t-km transported with the figures for tonnes carried reveals the relatively long distances over which ferrous metals (averaging 2 000 km) and the goods in the miscellaneous category travel. This latter

Figure 2.8. Freight t-km trends on CIS railways

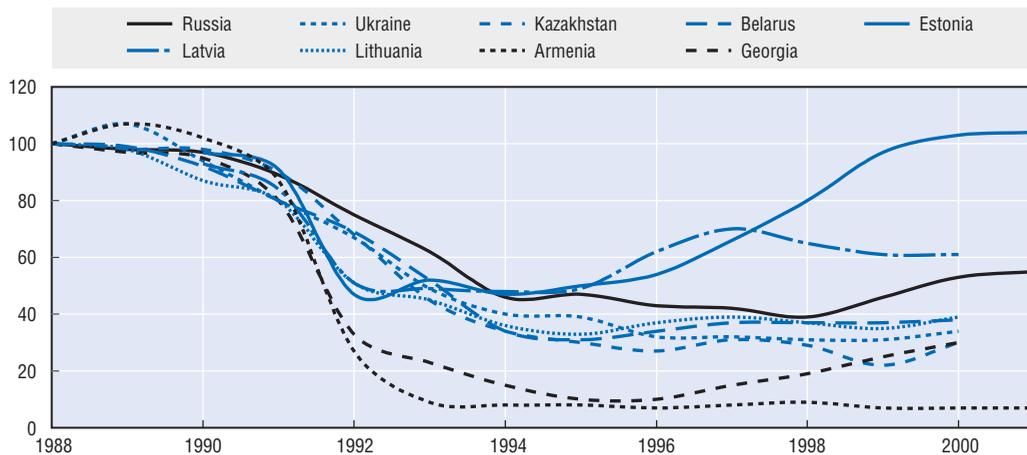
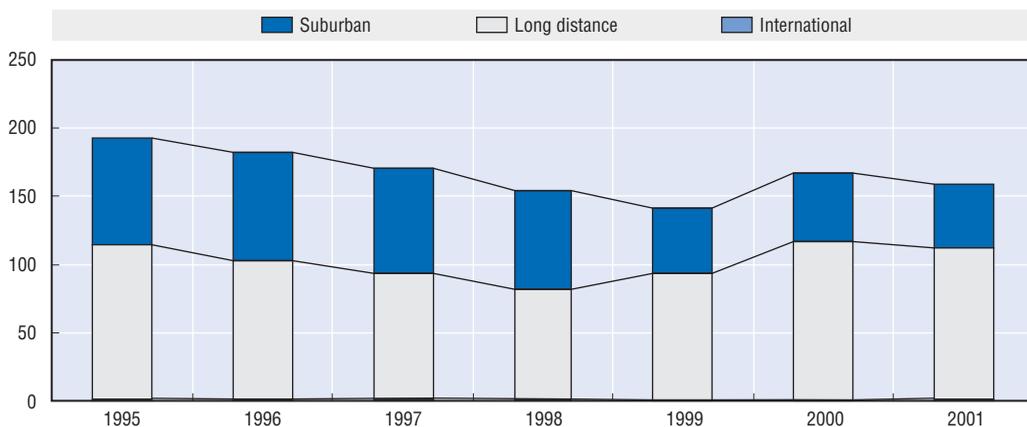


Figure 2.9. Rail passenger traffic in the Russian Federation

Billion p-km



Source: *Transport in Russia 2002*, Russian Statistics Office.

category includes the higher value manufactured goods and containers. Containers accounted for just 1% of net t-km transported in 2001.

Some of the smaller volume types of freight transport have shown the strongest dynamics in recent years. Container traffic on the railways has fallen sharply, but recent investments in the Siberian lines and interconnections with Asian rail networks, coupled with growth in trade between Asia and Europe, might attract new traffic if security against theft and service reliability can be improved sufficiently. Delays at road border crossings have promoted multimodal freight traffic for the railways but improvements at road border crossings would be expected to limit growth in this segment of the market.

Figure 2.10a. Rail freight traffic by commodity in billion t-km

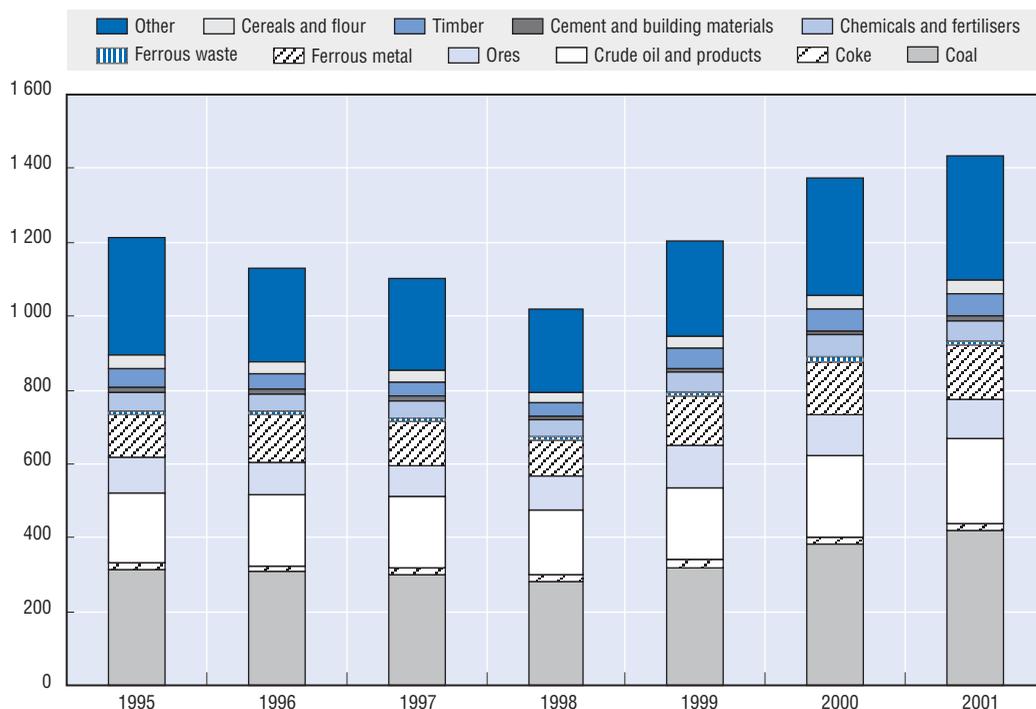
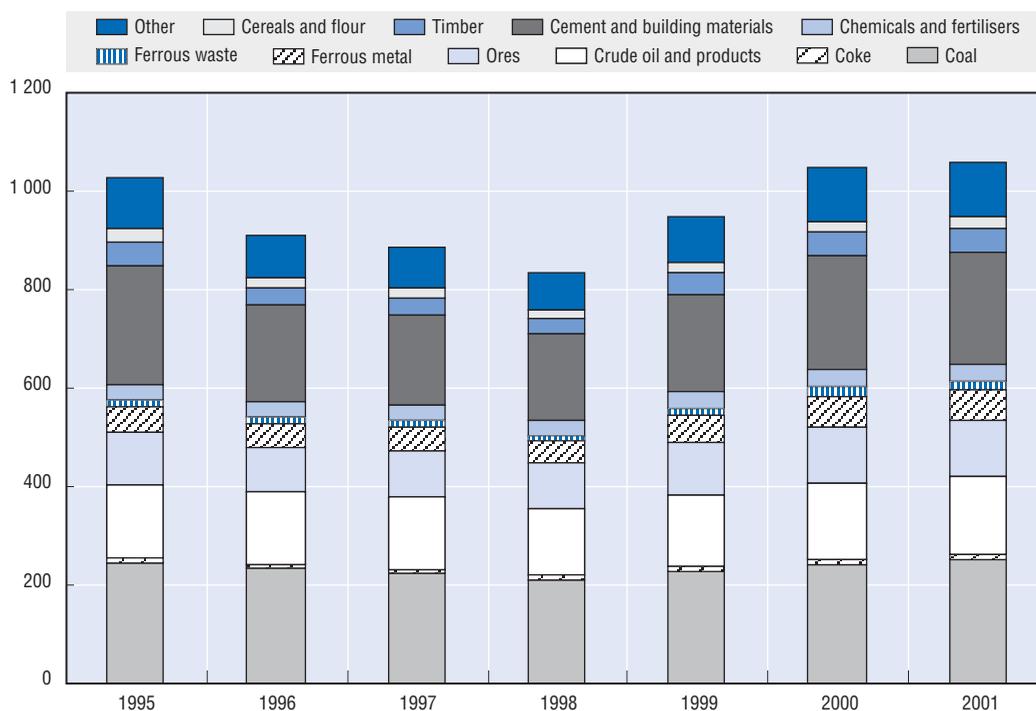
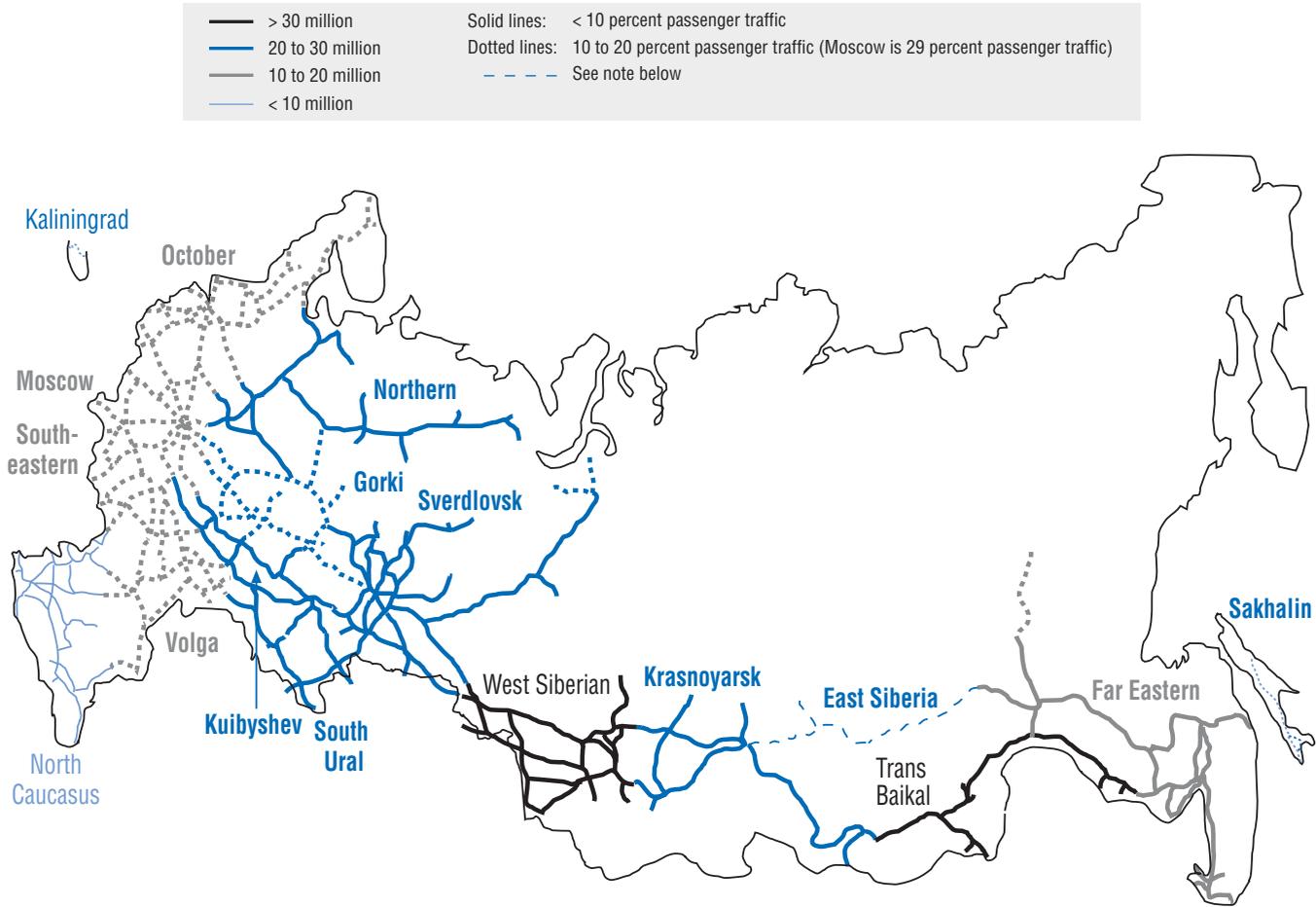


Figure 2.10b. Rail freight traffic by commodity in billion t-km



Source: Transport in Russia 2002, Russian Statistics Office.

Figure 2.11. **Average traffic density on the regional railways**
 Million TU/km of line



Note: The Baikal-Amur Magistral line operated by the East Siberia and Far Eastern Railways, running parallel and to the north of the Trans-Siberian railway line, carries little traffic, much less than the average traffic density of the two regional railways that operate it. This is due mainly to steep gradients. It is in poor condition and carries only local traffic.

Table 2.5. **Average length of haul by freight category in 2001**

	Share of t-km (%)	Share of tonnes carried (%)	Average haul length (km)
Hard coal	29	24	1 451
Coke	1	1	1 711
Oil and oil products	16	15	1 320
Ore	8	11	874
Ferrous metal	10	6	1 989
Scrap iron	1	2	761
Chemicals and fertilisers	4	3	1 506
Cement	1	21	532
Lumber	4	5	1 217
Grain and flour	3	2	1 441

Source: *Transport in Russia 2002*, Russian Statistics Office.

2.4. Geographic characteristics of the rail market

The maps in this section give an indication of traffic flows and Table 4.2 in Section 4.2 below provides detail of region-to-region freight movements. 63% of the traffic originates and terminates in the western part of the network (west of Omsk). 26% originates and terminates in the eastern half, leaving only 11% that travels between the two halves. Coal accounts for the very high density of traffic on the West Siberian Railway with over half of all coal transported in Russia mined within its region in Kemerovo Oblast. A large majority of this coal is transported westwards with 20% transported to destinations within the Western Siberian Railway region. Coal transport is important too for the neighbouring Krasnoyarsk region. 15% of all the coal transported flows east.

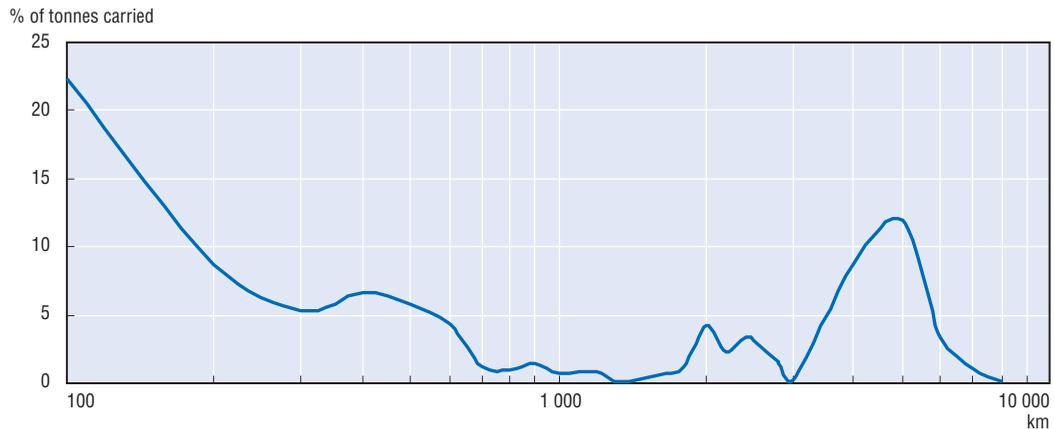
The Trans-Siberian¹³ line carried 375 million tons of cargo along its 10 000 km in 2003. Of this, 55 million tonnes was international freight (included in the origin-destination matrix in Table 4.2), the great majority of which was for import or export, with only 1.6 million tonnes of transit traffic (70% of which was movements from the Far East to Europe).

The map of traffic density also highlights the concentration of passenger traffic on the western networks and especially the Moscow Railway. See also the origin/destination matrices for freight and passenger traffic flows between the 17 regional railways in Section 4.4 of the report.

Figure 2.12. Origin to Destination Coal Movements over 1 mt per annum in 2001



Source: Data from MPS.

Figure 2.13. **Distribution of coal traffic by length of haul**

Source: MPS.

Notes

1. As discussed below in paragraph 33, standard MPS accounts did not conform with IAS accounting rules. On an IAS basis, MPS recorded a loss overall.
2. See the website of RZhD www.rzd.ru for details of the Management Board, Board of Directors and Audit Committee.
3. The Ministries were brought together under the new Ministry of Transport and Communications in March 2004.
4. For example the 158 km line built by SUAL to serve its bauxite mine in the Komi Republic.
5. Source: Interview with Ministry of Transport.
6. Figures from State Scientific and Research Institute for Road Transport (NIIAT), see for example *Prospects for the Use of Low Sulphur Motor Fuels in the Russian Federation*, ECMT 2002.
7. Currently income from profitable parts of freight traffic is diverted to support loss making passenger traffic. Taxes on the railway's profits would be a less distorting, more transparent and more sustainable way of raising the revenues needed to support these services.
8. "Class I" US railroads are the 9 largest railroad companies. These companies have annual revenues of more than about USD 250 million. There are also about 500 smaller, Class II or Class III US railroad companies.
9. MPS was the largest freight railway (tonne-km) in the world prior to the loss of Belarus, Ukraine and Kazakhstan traffic and the transition of the Russian economy.
10. "Traffic density" is defined as (tonne-km + passenger-km)/line-km.
11. Average length of freight movement (length of haul, or "lead") is total tonne-km handled/total tons originated.
12. Share of passenger traffic is passenger-km/(passenger-km + tonne-km) expressed as a percentage.
13. For a map of the Trans-Siberian railway and connections to neighbouring railways see www.transsib.ru.

Chapter 3

The government's railway reform programme

The Government of the Russian Federation has embarked on a determined programme of regulatory reform and restructuring of its railways. The decrees and laws already adopted provide clear direction whilst leaving room to adjust the path chosen for restructuring in the light of experience in implementing reforms. Great care has been taken to minimise the risks of disruption to the economy.

MPS together with the Federal Government Railway Commission,¹ presided by Vice Prime Minister Khristenko, have driven the reform programme. The Commission is made up of senior representatives of the Ministry of Economic Development and Trade, the Antimonopoly Ministry, the Ministry of Transport and the Ministry of Railways together with representatives from among the independent rail operators and shippers. Much of the detailed design of the reform programme has been undertaken by the railways themselves.

The Government has set out its rationale for reforming the railways,² noting that despite outward prosperity the railways face a number of serious problems whose consequences will become evident in the coming 5 to 10 years unless action is taken. The key point is a demand for investment to maintain the existing stock of fixed assets (of over 700 billion roubles). Investment is compromised by losses on the system as a whole (a 7 billion Rouble loss in 1999 according to an audit to international accounting standards), transfer of resources from profitable parts of freight transport to loss-making passenger services, and lack of legal frameworks and financial incentives for investment by the private sector. Recent rates of investment have seen a rapid deterioration in the availability of serviceable locomotives and wagons. The Government believes it has exhausted the potential for improving cost effectiveness through administrative reform, and without structural reforms to stimulate efficiency there is a danger that problems in meeting rail demand will restrict growth of the economy. The team agrees with this analysis.

The reforms have had a relatively long gestation period in order to provide for greater transparency in financial flows and establish asset values ahead of restructuring. Much work has also been done to institute a procedure for tariff regulation that can remain with government agencies following establishment of the joint stock company Russian Railways to take management of the railways out of the direct responsibility of a Government department.

The approach chosen for restructuring is centred on separating the operation of the rail infrastructure (tracks, signalling, electrification and other fixed facilities including stations) from operation of freight and passenger services. It is the policy of the Government that the infrastructure will be open for new, privately-owned carriers to compete with RZhD through non-discriminatory access to the infrastructure. The Plan³ seeks to create competition in the freight sector primarily through competing carriers on RZhD infrastructure, although it also discusses the possibility of competition between integrated (freight with infrastructure) entities in European Russia. The Plan also seeks to encourage a rapid increase in the private ownership of freight wagons and locomotives. The Plan calls for the termination of cross subsidy from freight to passengers through adoption of PSO

arrangements. It also discusses eliminating differences between the tariffs for domestic and international cargo en route to and from ports or land border crossing points.

The advantages and disadvantages of the approach outlined in the Plan have been thoroughly and professionally debated. There is solid justification for the approach as a starting point, and it appears to be well formulated at this stage in the reform process.

Decree 384 of 2001 turns earlier legislation into a three step programme of reform and sets out the following objectives:

- Stabilising rail quality of service and safety performance.
- Preserving a single economic space across the Russian Federation and ensuring development of the national economy.
- Ensuring national interoperability of the transport system.
- Cutting the cost of the rail system.
- Meeting the growing demand for transport services.

The key step in the first of the three stages for reform set out in the plan is the establishment of the joint stock company, Russian Railways, to take over management of day to day running of the railways from the Ministry of Railways. Preparatory legal work was completed in May 2003, notably with the establishment of asset values and their allocation. Following a Decree from the Federal Government in July 2003 on establishment of the joint stock company Russian Railways (RZhD OAO) and approval of the company's Charter on 18 September (Government Decision No. 585) the company was listed on the State registry of commerce on 23 September. It began operations on 1 October 2003. The Russian Railways is fully state owned, retaining all the railway infrastructure formerly owned by the Ministry, and maintains centralised supervision of train dispatching.

The other main aspects of stage one of the plan are:

- Phasing out of cross-subsidies from freight to passenger services.
- Phasing out differences in tariffs between export/import traffic and domestic freight traffic.
- Refining tariff policy.
- Development of competition in freight train operations, maintenance of rolling stock and passenger transport services.
- Providing for non-discriminatory access to federal railway infrastructure for independent freight and passenger transport companies and independent owners of rolling stock.
- Separating non-core social services (such as schools and hospitals) from the railways to cut costs.
- Improving financial incentives and social security guarantees for railway employees.

Progress on achieving these aims is mixed and in no case is the process complete.

Stage two of the reforms, scheduled for 2003-2005, envisages federal, regional and municipal government budgets taking over the funding of loss-making passenger rail services and railway expenditures related to national security. Freight train operations will remain integrated with infrastructure management in RZhD but independent train operators and shippers are envisaged to own half of the wagon fleet and some locomotives. A number of subsidiaries will be established in the Russian Railways holding company for

Box 3.1. Legislative summary

Federal Law 153 of 25 August **1995** on the *Federal Railway System* defined the legal basis for the organisation of the sector and the legal relationships between the various entities involved until 2003.

Edict No. 426 of 28 April **1997** of the President of the Russian Federation on *Key Provisions of Structural Reform in Natural Monopoly Areas* states objectives that include increasing the efficiency of rail transport, reducing transport costs, promoting competition in rail transport and improving the quality of service for the customers of the railways.

Decree No. 448 of 15 May **1998** of the Government of the Russian Federation *The Concept of Federal Rail Transport Structural Reform* states objectives that include cutting the costs of rail transport, promoting competition in certain rail operations, providing access to rail infrastructure for users regardless of ownership, ending cross-subsidies and funding public service requirements from government budgets, improving supervision of tariff setting and making financial flows in the rail sector more transparent.

Decree No. 384 of 18 May **2001** of the Government of the Russian Federation *A Program for Structural Reform of Railway Transport* (“the Plan”) sets out the restructuring program for the period 2001-2010 in three stages (see main text on previous page).

Decree No. 283 of 6 May **2003** of the Government of the Russian Federation on *Approval of the Activity Plan for Implementation of the Structural Reform Programme in the Railway Transport* for 2003-2005 provides a timetable for implementation of the second stage of reforms.

The **Federal Law on Railway Transport in the Russian Federation** came into force on 19 May **2003**. It provides a new legal basis for the organisation of the sector and the legal relationships between owners of railway assets, shippers and State authorities. Conceptually it divides rail transport between infrastructure services and train operations and provides the framework for legal relationships between the two. The law provides for the government to regulate rail transport in order to balance the interests of the State, the railway and the users of rail services. It also states that regulation will ensure open access to rail infrastructure. New carriers are required to own wagons and own or lease locomotives (there is no provision for EU style “authorised applicants”) and must hold a licence from the Ministry and a contract for infrastructure use with the national railway.

A Federal **Charter of Railway Transport in the Russian Federation** also came into force on 19 May **2003**. It defines business models and legal responsibilities for businesses providing rail sector services at a greater level of detail than the Federal Law on Railway Transport.

An **inventory of the assets** of the railways was completed on 30 June 2003, registering with the Property Records Office assets with a book value of 1.5 trillion roubles for transfer to RZhD. These assets (equivalent to approximately 50 billion euros) were transferred from MPS to RZhD under a **Consolidated Transfer Deed** agreed by RZhD, MPS and the State Property Ministry on 30 September **2003**.

Decree No. 585 of the Government of the Russian Federation **on the establishment of the joint stock company Russian Railways** was issued on 18 September **2003**.

Decree No. 703 of the Government of the Russian Federation, setting out **rules for providing services for the use of public railway infrastructure** was issued on 20 November 2003. It covers the contractual arrangements between the infrastructure owner and railway operators (including RZhD), providing a standard draft contract and preventing the infrastructure manager imposing on the train operator services over and above those essential to providing access to infrastructure. The rules cover the general case when infrastructure capacity is not limited.

Box 3.1. Legislative summary (cont.)

Decree No. 710 of 25 November 2003 provides rules on the provision of **non-discriminatory access to infrastructure** requiring equal treatment for all carriers. It defines non-discrimination; sets out categories of train operations in order of priority where infrastructure capacity is limited; and otherwise specifies that requests for access will be granted on a first come first served basis, according to a register of requests to be kept by the owner of the infrastructure. The decree identifies the Federal antimonopoly authority (currently the Ministry of Antimonopoly Policy) and the courts as the bodies to handle complaints regarding access.

* Shippers that purchase train paths directly from the infrastructure manager and separately hire the services of a train operator to use the capacity reserved.

suburban passenger services, some long distance services, rolling stock and track maintenance and construction, freight transit operations, intermodal operations, refrigerated containers and some other businesses. In the third stage of reform, from 2006, these subsidiary companies could be privatised. Possible establishment of a wholly owned subsidiary within Russian Railways for freight train operations is also to be considered at this stage.

Stage three of the plan, for the period 2006-2010, focuses on gradual development of competition. The objectives are to encourage competition in freight and long distance passenger train operations and in some commuter services and enable competition in rolling stock maintenance. There is a target for over 60% of freight wagons to be owned independently from RZhD, and for a growing share of locomotives to be owned privately. Investment is to be attracted through loans, the issue of bonds and the sale of shares in some of RZhD's subsidiary companies. Preparations are to be made for competition to encompass the infrastructure side of business as well as train operations.

Decree 283 of May 2003 sets out the current legislative agenda as follows:

1. First and most fundamental was incorporation of the Russian Railways as a **joint stock company**, achieved on 1 October 2003.
2. A decree on measures to promote **competition** is overdue (scheduled for May 2003) but a decree on rules for non-discriminatory access to infrastructure was issued in November 2003. A report from the Federal Government Railway Commission was due in November 2003 on improvements to the organisational, legal and economic frameworks to promote competition and also increase the share of rolling stock held outside Russian Railways.
3. The Railway Commission was scheduled to make proposals for improving **tariff regulation** in December 2003, including minimisation of barriers to market entry by new freight carriers. Analysis below suggests that the impact of the August 2003 version of Tariff Schedule 10-01 clearly promotes private investment in wagons and locomotives for own-account transport. Its impact in relation to stimulating the emergence of new general freight carriers is much less clear. It seems likely that the tariff schedule will need to evolve over the next years as its impact on this second kind of private operator becomes apparent and the objectives for competition policy are clarified.
4. A federal decree on **accounting** is scheduled for early 2004. This will require keeping records of income, costs and financial outcomes according to lines of economic activity.

The universal experience in OECD countries is that line of business accounting to IAS standards is essential to management, regulation and policy-making in the rail sector. Moreover, accounts to acceptable standards will be mandatory to meet Railway Commission Orders for clarity and transparency of rail accounts. RZhD plans to issue accounts by line of business on its first year of operation.

5. In March 2004 the Railway Commission is to report the effectiveness of the **financial reporting** systems adopted by the Russian Railways. The team notes that the work done by Deloitte and Touche for MPS can make a contribution to this report.

Notes

1. The Commission has established two task forces in relation to tariffs and competition; the first making recommendations on revision of the existing tariff schedules, the second on reform of the way charges are set.
2. Railway Sector Restructuring Priorities, MPS, November 2002.
3. Russian Government Order No. 384, May 18, 2001, "A Program for Structural Reform of Railway Transport." This Order is referred to as the "Plan" in the present report.

Chapter 4

Key regulatory challenges

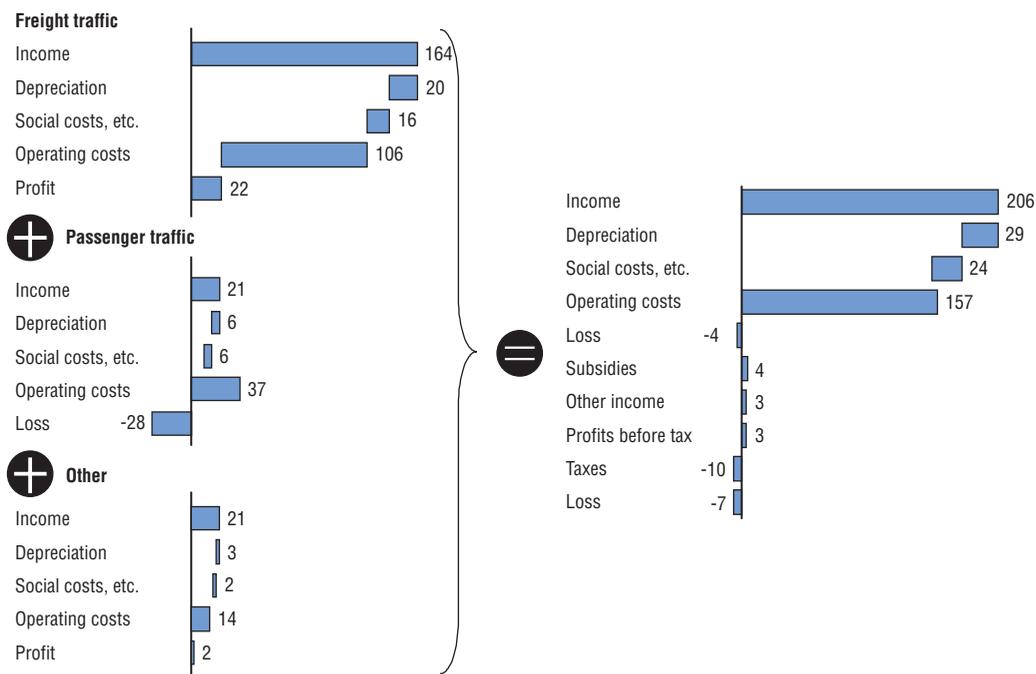
4.1. Accounting

The reform programme rightly stresses the importance of maintaining adequate and transparent accounts for rail sector businesses and progress has been made in improving the accounts for the national railways. Income and expenditure is now recorded in separate accounts for freight, long distance passenger transport, suburban passenger services and non-transport activities. For the last three years financial planning on the basis of budgets has been applied, with a central system of settlement of accounts. Accumulation of debts as a result of late settlement has been brought under control.

The law requires the publication of accounts to Russian accounting standards. In 1999 consultants Arthur Andersen¹ reviewed the financial performance of the railways on the basis of International Accounting Standards. The audit found a loss of seven billion roubles in place of the reported twenty six billion roubles profit. The most important point of divergence in the two accounting systems was the 24 billion roubles identified as social expenditure by Arthur Andersen (see Figure 4.1), which were not reflected in the profit and loss accounts of MPS's consolidated accounts but recorded elsewhere in its accounting system.

Figure 4.1. 1999 financial performance according to international accounting standards

Billion roubles



Note: Reported in Reference Materials for Rail Transport Structural Reform Programme, McKinsey Moscow, May 2001.

Source: Arthur Andersen.

It is important to complete the switch to international accounting standards and independent external accountants should be employed to audit the accounts of the joint stock company RZhD to IAS standards. This is essential to the framework for negotiations between the company and the government over support from public budgets for public services and for providing a transparent framework in which private business can enter rail markets in competition or co-operation with Russian Railways. It will also be an essential foundation to effective economic regulation of access charges and freight and passenger tariffs.

The issue of transparent and IAS compliant accounting was discussed in the Deloitte and Touche study conducted for MPS.² MPS subsequently adopted a detailed accounting data management system (SAP): it will now be critical for RZhD to move quickly to implement line of business management on this basis in order to support the organization defined in the Plan. As of the end of 2003 RZhD is to publish accounts that include data to IAS standards on a voluntary basis (as the law³ does not yet require this). RZhD is encouraged to ensure that accounts by line of business are part of these published accounts.

If non-discriminatory access to rail infrastructure is to be provided for new operators as envisaged in the reform program, then separate accounts will have to be produced for infrastructure and by each of the train operations by type within RZhD. This is provided for by Federal Law No. 27 of 27 February 2003 on features of administration and direction of rail transport property. MPS developed a classification system for accounting income and expenditure by type of activity, and this was made operational by RZhD on 13 October 2003. Experience in the development of EU law shows it is necessary to specify the publication of balance sheets as well as profit and loss accounts⁴ separately for infrastructure and for train operations.

Costs are not always easy to allocate in the production of rail services, as many costs are joint. It is not easy, for example, to allocate infrastructure costs between passenger trains and freight trains that share the same line. Costs are poorly understood on most if not all European railways. Even in Britain, where restructuring has been taken furthest, Railtrack proved to have very poor understanding of its costs or indeed its assets (see Annex B on UK experience).

In Russia the distribution of labour costs is used as the basis for allocating many other costs. Elsewhere, various accounting rules and economic and engineering models have been developed to make more accurate cost allocations. North America has the strongest relevant experience. Though inevitably somewhat arbitrary the models are sufficient to meet the requirements of negotiation between the private freight carriers and of review by the US regulatory agency (Surface Transportation Board – STB) and by courts in cases where companies are in dispute over track access charges. Many of the tools used have been developed by external consulting companies and are available commercially for adaptation by other railways. Russian Railways, and the regulatory authorities, will need to develop their own engineering models, or adapt models available on the market, to define and attribute costs more accurately. This will be useful for ensuring non-discrimination in charges for the use of federal rail infrastructure for Russian Railways and other train operators, and in determining the tariffs charged to shippers when their goods are transported in their own wagons instead of rolling stock owned by Russian Railways. Most importantly it can help structure charges for the use of infrastructure to ensure the

decisions of train operators in their choice of locomotives, wagon bogie design etc., do not impose excessive wear on the track.

Making existing information and, in due course, more accurate information on cost structures, available to shippers and to potential new train operators, in sufficient detail to establish business development plans, will be essential to achieving the goals of the reform programme relating to promoting competition. (Many railways and regulatory agencies charge a reasonable fee to cover the costs of providing such data, as is the case for example with data provided by the Association of American Railroads – see Section 4.3 *Discrimination in Practice* for details).

4.2. Competition policy and the goals of reform for freight transport

The main goals of the reform programme are increasing the efficiency of the railways, cutting costs and improving quality of service. They are to be pursued through two main routes: reform of the existing tariff system; and promoting competition in the railway sector. Competition in non-transport services, such as rolling stock manufacture and maintenance, is being created through spinning-off these businesses. Competition is also envisaged in rail transport services. The initial approach is to separate infrastructure management from train operations and encourage new train operators to run trains on the infrastructure of the Russian Railways. RZhD will own the infrastructure and operate the majority of freight trains, although passenger operations will be separated into subsidiaries that might eventually be spun off to regional or local governments, or even privatised. The reform programme also identifies the possibility of creating competition between vertically integrated railways.

4.2.1. Regulatory arrangements for the initial approach to competition

Whatever structure is chosen for the railways, regulation will be required, partly to ensure the development of competition (which is particularly important given rail's high modal share) and partly to ensure overall efficiency. The required arrangements depend on the structure that is chosen for the industry, especially the relationship between the organisation responsible for infrastructure management and those responsible for freight operations.

The initial industry structure, as set out in the Plan, envisages the emergence of new carriers in competition with the vertically integrated RZhD, which will be both by far the largest freight train operator and the infrastructure monopolist. This structure will require detailed and pro-active regulation if it is to result in more than the emergence of specialised own-account operators and niche carriers, along with private investment in wagons and (possibly) locomotives.

The Government's first objective has been to encourage large industrial rail users to build up their own wagon fleets in the face of a national shortage of wagons. The shortage has resulted from severe under-spending on maintenance and investment in new rolling stock since the early 1990s. The average age of freight wagons is 19.5 years and increasing rapidly as the national fleet deteriorates. The locomotive fleet is also ageing alarmingly (see Table 4.1). The government's goal is thus to transfer some of the financing of rolling stock to operators, carriers or investors beyond the current rail sector. It sees these industrial customers as better placed to evaluate the risks of investing in wagons, and in specialised wagons particularly, as they understand the markets for their products better

than the railways. In return the railway has introduced new tariff schedules for operators with their own wagons and for operators with both wagons and locomotives. Private wagon owners will be aiming above all to assure their wagon supply (both quality and quantity). They will focus on shipping large blocks of traffic and will seek to improve their annual wagon utilization rates levels above those achieved by RZhD. The new tariffs adopted in August 2003 may provide financial incentives for industrial concerns to operate block trains to haul their own traffic, and incentives for their transport companies to operate block trains for other shippers, over and above their interest in controlling rolling stock supply.

Table 4.1. **Age of locomotives**

Age in years	Electric locomotives (%)		Diesel locomotives (%)	
	1995	2001	1995	2001
1 < 5	3	1	5	1
6 < 10	13	3	23	6
11 < 15	20	14	20	27
16 < 20	15	23	21	24
21 < 25	16	19	18	21
26 < 30	12	18	8	15
> 30	21	22	5	6

Source: *Transport and Communication 2001*, Russian Statistics Office.

It is important to acknowledge that “competition” from large companies primarily interested in hauling their own commodities can be motivated more by the incentives in the tariff structure than from a desire to compete with RZhD: this kind of competition will not be the same as entry of “common” carriers which could compete with RZhD for all commodities across the entire rail network. It could be a starting point, however, for railway customers to invest in rail assets, to begin to manage their own rail operations and eventually to offer services to other customers as a common carrier competing with the RZhD.

The entry of new train operators for common carriage is provided for in the Federal Law on Railway Transport. Common carriers are required to obtain a licence from the Ministry of Railways (or its successor), they must enter into a contract with RZhD for the use of national rail infrastructure and they are required to own or lease locomotives. Conditions for award of a licence include presenting a business plan and identifying the skilled personnel needed to run trains. Train drivers are issued route-permits in a separate procedure. Two licences were awarded in conjunction with the entry into force of the Railway Transport Law on 19 May 2003.⁵ The main business for both companies is shipping oil products (Russky Mir, and Linkoil running trains between a refinery near St. Petersburg and Estonia), but they are licensed to carry all kinds of freight. By November 2003, nine carriers had successfully obtained licences. Licensed train operators are free to negotiate their own transport tariffs with customers.

The law provides that where there is free rail infrastructure capacity, access is guaranteed for licence holders. However, the procedures for determining capacity availability and defining capacity requirements have still to be tested. Decree 710 defines non-discrimination and where infrastructure capacity is constrained it provides rules for giving priority to trains. These follow typical European practice and give highest priority to

Box 4.1. Examples of independent rail operators in steel and oil markets

The Severstaltrans Group is an agglomeration of 19 transport, logistics and trading companies owned by Severstal, the largest steel producer in Russia, and Morell, a Russian offshore investment company. Three companies in the group manage train operations: Severstaltrans, Sevtechnotrans and BaltTransService, other companies in the group run port operations and one manufacturer's diesel locomotives. Severstaltrans provides domestic freight forwarding services, mainly reselling RZhD rail services. Carrying steel from Severstal plants accounts for nearly two thirds of its revenue, but it also forwards freight for other steel companies and timber producers. The company also leases and operates rail wagons for Severstal and trades coal and other commodities. Sevtechnotrans manages freight forwarding in Russia and freight transshipments in Russian ports. It also finances and leases rail tank wagons. BaltTransService manages unit trains carrying crude oil and oil products from refineries and inland pipeline terminals to ports on the Baltic, White and Black Seas. It operates trains, owning 2 100 tank wagons and leasing 7 300 wagons from RZhD. The company also owns around 600 gondolas, which it leases to other operators. In 2002 it managed the transport of 17 million tonnes of oil and oil products.

Oil company subsidiaries Russky Mir and SFAT own about 13 000 tank wagons. Russky Mir is a licensed rail operator but so far only leases wagons. Another oil company subsidiary, Linkoil operates around 4 000 tank wagons. Oil major Yukos operates 19 000 tank wagons, 6 000 of which are leased from Russky Mir, and Lukoil operates 5 000 tank wagons.

international and express passenger services and lowest priority to domestic freight trains: since the Russian system is quite different from Western Europe (see Figures 2.6 and 2.7), there would be a good reason for regulators to review whether this approach is durable. At the present time, freight traffic on the network is only slightly more than half the level in 1988, so capacity problems on the network are probably resolvable. More important to the development of competition will be the arrangements for access to facilities other than track, especially to stations, freight yards and train marshalling services.

The European Union is in the process of creating a completely new regulatory framework for common public regulation of its railways. The purpose is to promote an integrated European area for railways where cross-border services can be offered under the responsibility of a single operator. This is essential if the railways are to offer the quality of service required by customers for international traffic. It implies that national, state-owned monopoly train operators be authorised to operate in each other's territories, under uniform conditions determined at the European level. This process began cautiously in 1991 with Directive 91/440/EEC, which provided rights of access and transit on the infrastructure of Member States for international groups of railway undertakings to operate international freight and passenger services. It also gave access to infrastructure for all international combined transport services. Conditions for licensing railway undertakings and charging for the use of infrastructure were further defined by Directive 95/18/EC and 95/19/EC.

Given the limited impact of these measures on the market, a new set of Directives was tabled in 1998, leading to the adoption of the so-called "infrastructure package" on 26 February 2001. These rules were required to be transposed into national legislation by 15 March 2003. From that date, railway undertakings duly licensed in one country have the

right of access to the infrastructure of the other countries to provide international freight services. The infrastructure open to access under the rules is in a first phase extended only to trunk lines and access to ports and terminals. From 2008 access will be provided to the whole network. The “package” included 3 directives, 2003/12/EC and 2003/13/EC amending earlier directives on the structure and development of the railways and licensing railway undertakings, and 2003/14/EC on allocation of capacity and charging for the use of infrastructure. The institutional structures and procedures and the charging framework established will have a major impact on domestic rail markets as well as regulating international traffic. Most notably the Directives require a clear separation of infrastructure management from train operations, and where infrastructure is integrated with train operations key functions including allocation of infrastructure capacity have to be removed to an independent body. The Directives require establishment of a regulator in each country and set rules for the formulation of charges for the use of infrastructure. Charges are to be based on marginal costs, with mark-ups allowed where the government seeks to recover more than marginal costs from the system as a whole. Details are provided in Annex E.

The possibilities provided by the infrastructure package have been exploited by a number of new entrant carriers: DLC of Belgium; HGK, RAG and Rail4Chem of Germany; Rail Traction Company of Italy; Shortlines of the Netherlands; and IKEA Rail of Sweden. These companies have demonstrated an ability to offer innovative services on international corridors, leading the traditional national railway undertakings to respond to this competitive pressure. They have also shown that it is possible to offer better services and compete with road haulage. New directives and regulations are scheduled for adoption early in 2004 that will accelerate the process of opening the freight market and increasing competition. Common rules for safety and technical interoperability will also be created together with a European Railway Agency to steer the harmonisation process.

If the approach set out in Russia’s Plan is to work, a number of practical measures will have to be taken along the lines of EU regulations, to ensure that new carriers are encouraged to enter the market. These are set out below.

The key requirement is that **access to infrastructure⁶ and charging** should be carried out in such a way that new (common as well as specialised) carriers can compete with RZhD. Given the proposed interim structure (RZhD being both the main freight carrier and the manager of the infrastructure), this means that the rules for access to infrastructure and for the setting of charges should be the responsibility of a body that is independent of RZhD.

In the EU, in order to ensure that new entrants understand the capability of the network, infrastructure managers are required to produce a Network Statement, which must contain information on the technical nature and limitations of the network, the conditions of access to the network and the rules for capacity allocation, including the tariff structure and the rules of priority to be applied in case of conflicting demands for capacity. RZhD could be required to do the same.

Charges for the use of infrastructure must be free of discrimination between different railway carriers that perform services of an equivalent nature in a similar part of the market (this is a requirement for member states of the EU). Non-discrimination in the formulation of tariffs is not, however, sufficient to achieve the full benefits of competition (higher standards of service, services better matched to the demands of the market and

better value for money). Carriers must have control of as many of their costs as possible. They must be free to find more efficient ways of organising their operations and sourcing supplies. This means that they have to be free to procure services over and above access to essential fixed assets. The scope provided by the existing tariff system to contract separately with RZhD for a limited number of separately identified services may not be sufficient to provide the necessary cost control for new carriers.

An economic regulator will be required to protect the public interest from an economic and commercial viewpoint. This body should be independent in its organisation, funding decisions, legal structure and decision-making from the infrastructure manager or any carrier. It should also be an independent agency of the government free of potential conflicts of interest that might arise were it to also have responsibilities for regulating prices that are themselves affected by rail charges (such as coal) or have a large impact on rail costs (such as electricity). The principle role of an economic regulator, under the proposed structure, will be to ensure that infrastructure access is fair and charges appropriate. This is a highly complex task given the conflicting objectives that the government is likely to have. For example, in determining whether a train operator can have access to the network for a particular flow of traffic and setting access charges the regulator may need to have regard to government objectives for reducing subsidies to the railways (or increasing payments from them), for encouraging modal shift to rail for both freight and passengers, for encouraging industrial production in particular parts of the country and for developing the network. The weight given to these different objectives will affect access policy.

Any carrier should have a right to appeal to the regulatory body if it believes that it has been unfairly treated or discriminated against. In particular, carriers should be able to appeal against decisions adopted by the infrastructure manager concerning transparency of information, the capacity allocation process and its result, the level or structure of infrastructure fees, safety certification, enforcement and the monitoring of the safety standards and rules. The regulatory body should have the power to demand relevant information from the infrastructure manager, railway undertakings and any third party involved. The regulatory body would arbitrate on complaints and require action to be taken to remedy the situation. Decree No. 710 of 25 November 2003 provides for appeal to the Antimonopoly Ministry and the courts in cases of dispute over access to rail infrastructure. This is an appropriate provision in the current institutional framework of Russia, but the Antimonopoly Ministry already has a heavy case load of complaints from all areas of economic activity and a **sector specific regulator** for the railways is likely to prove necessary if competition is to develop whilst RZhD operates trains as well as managing all public railway infrastructure.

The regulator will need to supervise closely the granting of **access to infrastructure**, especially while RZhD remains an integrated infrastructure manager and train operator. Decree 710 sets out categories of train operation by priority for access to infrastructure where capacity is constrained and provides for access to be awarded on a first come, first served basis. There is an issue, however, of whether the current pattern of use of infrastructure should be taken as the baseline, where it fills capacity, or if some other criteria should be adopted, based on efficiency for example, for determining if some existing operations should be excluded to make way for new operators. Decree 703 of 2003, which governs the negotiation of infrastructure services between RZhD and other train operators, applies only to the general case where capacity is not constrained. It is not clear

what framework applies should new operators seek access to infrastructure deemed already to be operating at full capacity by RZhD. This gap in the regulations will need to be addressed. The issues involved are complicated and a sector specific economic regulator would be best placed to address them.

The economic regulator may also need to take **other measures to reduce barriers to entry** and these are likely to be greater if there is a dominant railway undertaking, as there will be initially under the proposed structure. For example the regulator may need to:

- Ensure that surplus second-hand rolling stock belonging to RZhD, is not unreasonably withheld from potential new entrants, especially where it is specific to a particular type of traffic.
- Intervene to ensure that potential new entrants are able to obtain locomotive drivers or training for new drivers, as well as receiving equal access to train paths.
- Provide assistance to potential new train operators in meeting licensing and safety requirements.

All **train operators require licensing**, and this is provided for by the law, with the Ministry of Railways the issuing authority. Should the institutional framework change, licensing must always remain the task of a public body. Ideally it should be a task for a regulator, since this provides the regulator with powers of enforcement for its decisions. If a specific rail regulator is created, licensing should be one of its duties.

Experience in the EU underlines that **safety certificates** need to be issued by a **safety regulator** that is independent in organisation, funding decisions, legal structure and decision-making from any infrastructure manager or carrier. The safety certificate should set out the railway company's safety requirements and ensure the safety of services on the routes it operates. In order to obtain a safety certificate, the company would need to comply with regulations laying down the technical and operational requirements specific to the rail services being provided and the safety requirements applying to staff, rolling stock and the undertaking's internal organisation. In particular, it should require proof that the staff employed to operate the trains have the necessary training to comply with the traffic rules set by the infrastructure manager and to meet the safety requirements for train movement.

In order to encourage competition under the initial approach adopted in the reform plan, **infrastructure management and transport operations should be separated** to the greatest extent possible, as this will provide greater transparency in the provision of access and charging. Ideally this requires complete legal separation of infrastructure from train operations since even retaining both infrastructure management and transport operations in a holding company may lead to discrimination in favour of the incumbent undertaking.⁷ If it is decided not to make this legal separation, infrastructure management and transport operations should be established as separated divisions of RZhD with their own profit and loss accounts, balance sheets and management teams. This will ensure transparency of the costs on which charges are based and reduce (but not eliminate) the risk that the management of the infrastructure part of Russian Railways will be influenced by the commercial interests of the freight part.

Setting up the regulatory arrangements for the proposed interim structure is a formidable task for the Government. It requires establishment of an economic regulator and a safety regulator. The two regulators would need to co-operate and could be under a common umbrella organisation. Both must be independent of the industry and could be

independent of government (they could also be part of an existing regulatory body but they require specific skills: both require skills in railway technical issues, policy and law, and the economic regulator also requires skills in economics and finance). They must have the legal powers to carry out their duties. To illustrate the potential size of the regulatory task, for the railways in the UK,⁸ the economic regulator⁹ has about 140 staff and the safety regulator¹⁰ has nearly 300 staff who are directly involved in rail.

The team therefore considers that before embarking on the major task of establishing a regulatory system designed to cope with the structure proposed, further thought should be given to reducing the regulatory burden by either creating a vertically separated structure without dominance by a single train operator or by separating the railways horizontally and establishing vertically integrated companies that would compete with one another.

4.2.2. Horizontal separation into competing vertically integrated operators

The second approach, competition between vertically integrated railways, is generally less demanding on regulatory authorities. Freight tariffs to customers who are directly served by more than one railway company, or who are close enough to a second railway company that they can threaten to take their business there, can be determined by competition, usually without the need for regulatory intervention. In addition, if there is a degree of balance between the economic power of each company, the companies may agree voluntarily for each to use the tracks of its competitors, under voluntarily negotiated access terms.

The Plan provides the option for creation of competing, vertically integrated railways in European Russia in the third phase of restructuring. Because the issue of rail versus rail competition is directly related to the need for regulation – how widespread and how comprehensive regulation needs to be – it is worthwhile examining examples of how such competition might be created by appropriate design of the system structure.

Because issues of system structure have been important in the analysis of railroad mergers in the US, the Federal Railroad Administration, the STB and the railroads have access to system models that permit the assignment of each shipment (based on the freight waybill) to an originating station and a terminating station. The waybill includes all relevant information, such as shipment weight, number of wagons (by type), type of train, commodity, tariff class and revenue generated, routing information (if the routing is not obvious), date of shipment, etc., needed to analyse the flows of all commodities over all lines in the system. Use of the model permits identification of the competitive effects of proposed railroad mergers (which might reduce the access of some shippers to alternative railroads). Application of such a model in Western Russia would permit analysis of the degree of competition possible if the system were broken into two or more competing systems.

Such a network model is not available to the public in Russia, so discussion of a competitive rail structure in Western Russia in this report must be based on cruder information. Using data provided by MPS in an 80 x 80 origination/destination matrix, the team was able to construct an approximate matrix of the freight flows among the 17 regional railroads (see Table 4.2). This Matrix suggests that Russia's rail freight flows divide rather naturally between a "Western" section (including Kaliningrad, October, Moscow, South Eastern, North Caucasus, Volga, Kuibyshev, Gorky, Northern, Sverdlovsk and South Ural) and an "Eastern" section (West Siberian, Krasnoyarsk, East Siberian, Trans Baikal, Far Eastern, and Sakhalin) (see Figure 2.1). About 63% of all rail freight tonnage in Russia originates *and* terminates in the Western region, while 26% originates *and* terminates in the Eastern region,

leaving only 11% that is interchanged between the regions. The Western region, with 63% of the tonnage on 73% of the track-km would still have an average traffic density higher than the average for the US system, so it seems reasonable to argue that it would be able to sustain line versus line competition as in the US.

Guriev, Pittman and Shevyakhova¹¹ have based one interesting example on a Western Russian region that is the same as that identified above. The system they examine would bring line versus line competition between two integrated railway concessions to most markets in the Western region, as shown in Figure 4.2. They make it clear that more than two competitors would be preferable, but without a detailed traffic flow model they did not feel it appropriate to speculate on how a larger number of competitors might be structured. Their two systems could compete for shipments within European Russia, either over parallel portions of their track networks or at common points such as Cheliabinsk, Samara, Kursk, Smolensk, Moscow and St. Petersburg.

The two systems could also be connected to the Eastern region in a way that would permit either system to receive the tonnage flowing across the boundary, and they could compete to deliver the Eastern cargos flowing to European Russia (from Table 4.2, there is almost 3 times as much tonnage – mostly coal and petroleum products – flowing West as there is flowing East). Such a system would reduce the problem of regulating monopoly pricing power to the issue of access charge regulation in the East. Moreover, if the competing Western carriers chose (and, with non-discriminatory access charges, they are sure to do so), they could obtain access slots in the Eastern region and carry their competition all the way to the Pacific coast of Russia.

Guriev, Pittman and Shevyakhova propose creating the competing carriers in European Russia through the award of exclusive concessions. This would bring competition for the market (competition for the concession) as well as the resulting competition in the rail freight market. This has the added advantage of providing a mechanism for introducing competition between vertically integrated companies without changing a law that currently proscribes the division of RZhD core assets. As their paper shows, there has been successful experience with concessioning of railways in this way in Mexico, Brazil and Argentina. Their experience suggests that a 30 or 50 year concession agreement is long enough to encourage private companies to make substantial investments in infrastructure.

A simpler example can be seen in Figure 4.3 in which the existing 17 regional railways have been regrouped into 7 new, contiguous railways (9 in total, including Kaliningrad and Sakhalin). Transferring two short line segments from Northern to Gorky would give a new North-Central railway a direct connection to the October Railway and its ports. Such a simple regrouping would give almost all the Eastern cargos competitive access to Moscow and St. Petersburg, and it would give competitive routes for export and import traffic as well as for Trans Siberian traffic. Even this degree of competition could well reduce the need to regulate freight tariffs to and from the Eastern region, and free most traffic in European Russia from the need for end use tariff regulation.

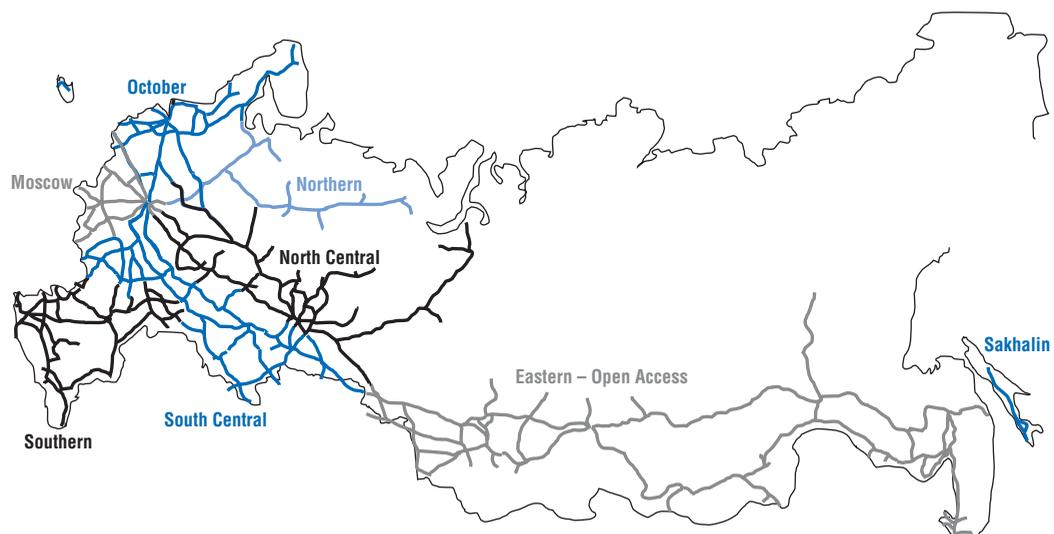
Of course, neither of these examples should be seen as conclusive because they are not based on definitive information. Instead, they are meant to suggest approaches that deserve consideration, preferably sooner rather than later, as the analytical basis for the later phases of the reform is developed. A range of intermediate re-combinations of the existing regional railways could be envisaged to provide for competition between several vertically integrated railways, preferably more than two.

Figure 4.2. **Two competing vertically integrated rail freight companies for Western Russia**



Source: Guriev, Pittman and Shevyakhova, *A Proposal for Railroad Restructuring in Russia*, 2003.

Figure 4.3. **Could the regional railways be reorganised to provide a mix of integrated competitors and open access for rail freight?**



Source: Louis S. Thompson, World Bank.

4.2.3. Choosing the approach to competition

The initial approach to introducing competition set out in the Plan, providing access rights for new carriers to compete with vertically integrated Russian Railways, will be demanding on the regulators if it is to result in more than the appearance of a few specialised niche operators. The structure of the sector concentrates economic power in the hands of Russian Railways, which will be both by far the largest freight train operator and the infrastructure monopolist. Regulation will have to be designed and implemented to limit the exercise of this power. Some preference or at least flexibility in infrastructure use charges may be required to provide sufficient incentive for new operators to enter the market as general freight carriers in these circumstances, although such preferences should not be allowed to jeopardise the ability of the infrastructure manager to recover its full costs.

Experience suggests that there are at least two sets of advantages of competition between vertically integrated railways that should be included in any cost-benefit analysis of different reform models. First are the simple, everyday “economies of scope” or “economies of co-ordination” between administering a track system and running trains. When a railroad system is vertically separated, a large number of decisions and transactions that were formerly made *within* an integrated company must now take place *between* independent companies. The scope for both honest misunderstandings and strategic behaviour may increase exponentially. Second, in the rail sector as in the electricity sector, serious questions are being raised across the OECD as to whether a vertically separated “grid” company receives the right incentives (and enough resources) for investment, both for maintenance and for expansion. Many of the problems of both the UK rail system and the US electricity system have been attributed to a lack of investment in the “grid”, which has been in turn attributed to the fact that in a vertically separated system it is in the running of trains (or the generation of electricity) that money is to be made, not in the operation of a regulated network enterprise. Maintaining vertical integration in the rail sector – through, for example, the creation of integrated regional companies that compete with each other over parallel routes or at common points – may avoid these problems.

Both models for competition could coexist in Russia. Whilst competing vertically integrated railways could be created in western Russia, east of Omsk, and especially east of Taishet (junction of the Trans-Siberian and Baikal-Amur lines), there is only one trunk rail line. This is the part of the railway system where regulated open access to state owned infrastructure completely separated from all train operators would be most appropriate.

4.3. Tariff regulation and charges for the use of infrastructure

4.3.1. Tariff regulations

Approaches to the regulation of freight transport tariffs and infrastructure charges

In Europe and North America, the regulation of charges for the use of rail infrastructure by train operators is distinguished from the regulation of freight transport tariffs. In Russia the regulatory authorities are attempting to regulate both through a single system. Though the full derivation of the new tariff system is not clear, it appears that the long standing freight transport tariff system is being modified to break down the transport tariff into elements structured to match at least partly the distribution of RZhd’s costs between traction and freight wagons, with other costs essentially assigned to the monopoly sector infrastructure use charges.

Freight transport tariffs are no longer regulated anywhere in Western Europe because competition from road haulage and other modes is so universal that regulation is unnecessary. Certain rail freight transport tariffs are regulated in North America¹² and Australia in order to prevent abusive pricing by railways that enjoy market power in the transport of particular commodities over particular routes, usually over long distances. Grain and coal are the commodities most often concerned, although it is actually rare for freight tariffs to be prescribed by the US STB. Tariffs are only regulated where there is no competition for the traffic between train operators or from alternative transport modes. OECD governments tend to prefer to foster competition instead of resorting to tariff regulation whenever possible.

Russian law¹³ identifies natural monopoly sectors of the economy where tariffs are to be regulated and the railways fall under this law. Nevertheless, competition already exists in some markets. Competition from road haulage for higher value freight is developing rapidly in European Russia, particularly over distances below 400 km. Niche rail operators carry more freight than RZhD in some markets. For example own-account transport companies carry 60% of the oil carried by rail in an overall market where pipelines carry 20% of oil products and river barges 5%.

Rail end-user tariffs ought to be free of regulation in markets demonstrating competition. This is necessary if rail is to be able to compete with road haulage and continue to carry the high value traffic that generates most of RZhD's income. If tariffs are not deregulated in markets where rail faces competition from other modes that have themselves been deregulated, the railways risk long term insolvency in exactly the same way that US railways came close to bankruptcy in the 1970s. If tariffs are not freed in markets where rail-on-rail competition develops, some of the benefits of competition will be foregone, and prices to shippers will be higher than they need be. Niche carriers (which are free to negotiate shipping rates) currently charge shippers substantially more than RZhD's regulated tariffs. Freeing tariffs in these markets would immediately require a new approach to setting access charges.

The European Commission believes that infrastructure use charges should generally be calculated according to "marginal" costs: the costs that running a particular train, or train type, imposes on the infrastructure.¹⁴ These costs generally relate to wear and tear of the track (which varies with axle weight, locomotive type, speed, etc.) and train path, the occupation in time and space of the track (which depends on speed and stopping schedule). On busy lines the characteristics of the train path can have an important impact on the availability of capacity to other trains and this is also usually taken into account in setting the charge. In addition, in countries that wish as a matter of policy to collect some portion of fixed¹⁵ rail infrastructure costs from users (discussed in detail in Section 4.3.2), part of the fixed infrastructure costs may be assigned to users by various techniques. In most cases only a small part of the fixed costs are charged to users, with uncovered fixed costs in Europe expected to be paid by Governments. In the United Kingdom and some other countries the fixed part of the infrastructure charge is known as an access charge, and the variable part as a use charge.

In North America, when one rail company uses another company's track, the access charges are usually negotiated without regulatory involvement. In most cases, access rights are reciprocal (Railway A gets access to B's tracks, B gets access to A's tracks) and the access fees tend to be offsetting, so the exact approach is not critical and simple formulae

are typical, for example a set price per wagon-km. In some cases, access rights (called trackage rights in North America) have been mandated by the STB: in some of these mandated cases, the STB has prescribed the access charge which has tended to be based on the variable costs of serving the tenant operator plus some allocation of fixed costs.¹⁶

The charges for the use of rail infrastructure being introduced in Russia are thus formulated in a way that bears no relation to the approach used either in Western Europe or North America. The systems differ most in respect of the linkage to variable costs. The Russian infrastructure charges are derived from socially (and politically) determined freight transport tariffs, which differ from commodity to commodity and are strongly related to distance of haul. By comparison, the EU approach is related only to the cost of providing infrastructure services and applies to a much smaller percentage of rail costs than will be the case in Russia. The North American approach is also basically related to infrastructure cost, and not to the tariff of the commodity being shipped over the infrastructure.

The main objectives of Russian freight transport tariffs

Russian Railways have historically been the only provider of transport services for many types of freight over large parts of the country. Tariffs have therefore been regulated in the absence of a market to establish “fair” transport prices. Currently the price for transport of all commodities is regulated, regardless of where transport takes place and regardless of whether competition exists from road, air or shipping modes. Competition from road haulage is, however, already intense in some parts of western Russia, even if some commodities cannot be hauled economically by road.

The fundamental purpose of rail tariff regulation in Russia in the past has been to help control prices throughout the economy: prices of inputs to industry and prices to consumers. The system emerged naturally as a key part of central planning. Since the beginning of the economic transition, tariff regulation and the tariff structure have undergone successive modifications, aimed at introducing incentives for greater efficiency. Nevertheless, the overriding purpose of tariff regulation remains to help “balance” economic development, contributing to regional development by promoting development of remote parts of the country (or attenuating economic collapse) and assisting industries in financial difficulty. Higher value freight, and particularly freight carried to or from the ports for export or import, is charged higher tariffs and the revenues used to support the transport of low value commodities, especially long distance movements of coal and ore.¹⁷ Periodic revision of the tariff rates and structures are undertaken to respond to changes in economic conditions for socially important parts of the economy including large industrial customers of the railways.

Tariff schedules

Tariffs are calculated according to formulas set out in tariff schedules that run to several hundred pages. The basic methodologies followed by current tariff schedules were formulated in amendments to tariff regulations adopted in the late 1980s and early 1990s as follows:

- 1989, Tariff Price List No. 10-01, which regulates pricing of domestic freight traffic.
- 1993, Tariff Price List No. 10-02-16, which regulates pricing of domestic and international passenger traffic.

- 1993, the Tariff Agreement between CIS and Baltic States that was the model for the *Railway Tariff policy of the CIS for International Freight Traffic*, which regulates the pricing of international freight traffic.

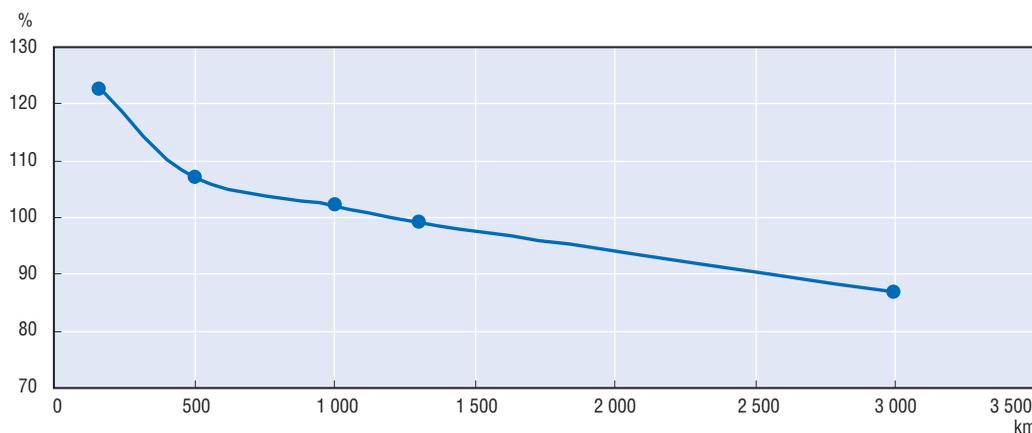
Domestic rail tariffs are currently set under the regulatory supervision of the Federal Energy Commission (FEC), which also regulates electricity and coal tariffs. The domestic freight tariff schedule (Price List 10-01) has been adjusted more or less annually in recent years. The Ministry of Railways draws up new tariff proposals with support from the Scientific Research Institute for Railway Transport. An inter-ministerial committee, the Railway Tariff Commission, then considers these proposals.¹⁸ Each Ministry has a duty to ensure the proposals respect its own specific policy priorities (for example, non-discrimination in the case of the Antimonopoly Ministry). Once the Commission's approval is obtained a decision of the Federal Energy Commission is required to bring the new tariffs into force. Whilst the FEC has the legal responsibility for ensuring the tariffs are properly formulated, tariffs are calculated and applied by the Ministry of Railways. The most recent revision to the domestic freight tariff schedule,¹⁹ agreed on 17 June 2003 by the Federal Energy Commission,²⁰ entered into force on 28 August 2003. The MPS tariff experts became RZhD employees on its incorporation in October 2003.

Transit tariffs have been negotiated with CIS countries at lower rates than the import/export tariffs that are part of the domestic tariff schedule. Inevitably this distorts markets and results in some goods for delivery to Russia being transported in transit to a third country to benefit from the lower tariff, then transhipped and imported by road for distribution in Russia.

Price List 10-01 identifies three broad classes of commodity. Tariff formulas begin with the calculation of a basic tariff for Class II commodities. The tariff for the Class II commodities in RZhD-owned wagons is initially determined by a formula based on shipment size and distance. To this transport tariff (per t-km) is added a loading and unloading charge (per wagon) to arrive at the total tariff. The distance component of the transport tariff is illustrated in Figure 4.4. The tariffs for Class I and Class III commodities are derived from the Class II tariff.

Figure 4.4. Distance taper applied to all classes of freight

Percentage of the average transport component of the base tariff at the distance given



Source: MPS.

The basic objective of the three class tariff system is to ensure that the transport cost is not higher than a target percentage of the delivered price of the product: very low value commodities need to pay low tariffs in order to stay within the target percentage while higher value products can pay more and still not be overly burdened by transport costs. In addition there are over 40 series of coefficients to differentiate tariffs within the classes according to the specific commodity and other circumstances such as particular routings. The three classes of commodities are as follows.

- Class I: coal, ore, timber, aggregates, etc. Class I commodities generally travel at a tariff level of 75% of the Class II commodity tariff at distances below 1 200 km falling in steps to a level of only 55% of Class II commodities at a distance of 5 000 km and more (see Table 4.4). The reference distances are based largely on the distance to market, especially for export commodities.
- Class II: oil, grain, fertilisers, food, semi-finished goods.
- Class III: Chemicals, ferrous and non-ferrous metals, machinery, finished goods. Class 3 tariffs are generally 74% higher than tariffs for Class II commodities at all distances.

Table 4.3. Distribution of freight traffic by class (domestic traffic and traffic to and from ports, %)

	Class I	Class II	Class III
Tonne-km	53	25	21
Tonnes	61	25	14

Source: MPS/RZhD.

Table 4.4. Additional distance taper for Class I commodities

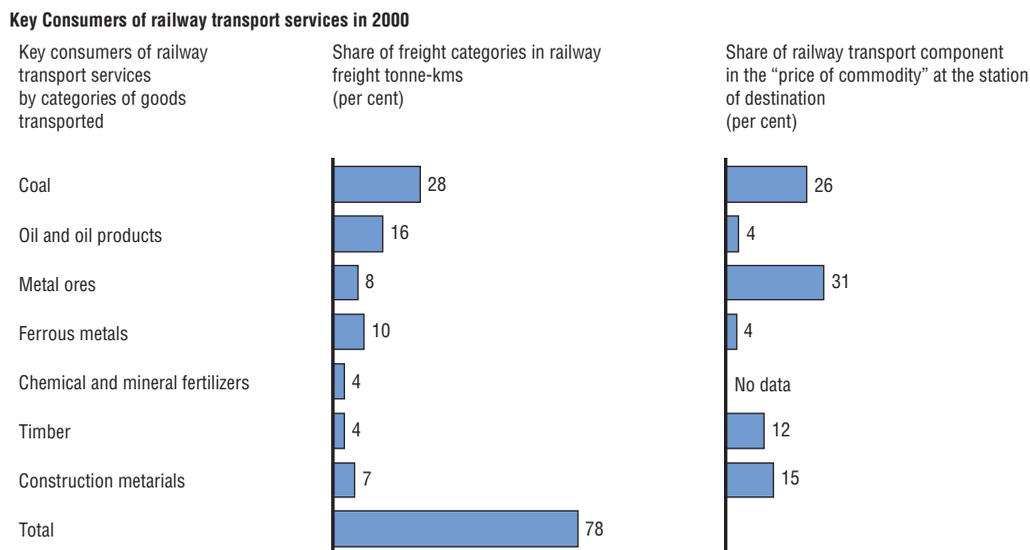
Sample distances	Ratio applied to the base Class II tariff in the tariff formula	Percentage of basic Class I tariff (%)
< 1 200 km	0.75	100
1 200-1 400	0.74	97
1 800-2 000	0.71	95
2 000-2 200	0.70	93
2 400-2 600	0.68	91
3 000-3 200	0.65	87

Source: MPS/RZhD.

Objectives of tariff reforms

The immediate priority for tariff restructuring was to stimulate investment in rolling stock by private operators in order to make up for the shortage in wagons and locomotives following a decade of severe underinvestment by the railway. The reforms have been highly successful in facilitating such investment. However, in some markets private operators are able to charge rates significantly above the regulated tariff for carrying traffic in specialised wagons. This suggests that at least in these markets it is the establishment of a legal framework for the use of private wagons on the network coupled with the overhanging rolling stock shortage, rather than the structure of the tariffs and access charges, that has driven investment so far.

Figure 4.5. **The share of transport costs in commodity prices is a key consideration in setting tariffs**



1. As of May 2000.

2. Types of freight that represent the key categories of freight, namely: power-generating coal, diesel fuel, ferrous ore, rolled sections, chemical and mineral fertilizers, edge-surfaced lumber, cement.

Source: Statistical report on operation of railway transport, Railway Transport Scientific Research Institute (domestic transport); Reference Materials for Rail Transport Structural Reform Programme, McKinsey Moscow, May 2001.

One of the overall objectives of recent modifications to the tariff schedules has been to improve transparency and to a degree to simplify the tariffs. A conscious choice has been made, however, to gradually modify the existing tariffs, rather than reform the system as a whole, in order to avoid shocks to the economy and sudden changes in income for the rail companies. Inevitably the successive layers of differentiation reflected in the adjustment factors make tariff calculations complicated (and actually reduce transparency). Moreover, the various imposed adjustments for particular commodities and for longer distances clearly result from social and political objectives that are not related to the cost of transport. It is difficult to understand or predict the economic incentives that result, or to judge the effectiveness of incentives that changes to tariffs were intended to create. At the same time, the incentives introduced to stimulate improvements in efficiency are differentiated to such a high level of detail that there is little or no room for innovation. The overall effect may be to preserve the status quo in terms of technology and organisation of transport services regardless of performance.

Another stated objective is to evolve tariffs that reflect costs. The differentiation introduced does this to some extent but tariffs are uniform for the whole country. Each of the 17 regional railways applies the same tariffs, despite significant differences in costs. For example, unit costs on the Moscow Railway are estimated to be nearly double those of the West Siberian Railway.²¹ More important, given equal wagon loading and train length, there is essentially no relationship between commodity carried and infrastructure costs. Insufficient linkage of infrastructure use charges to costs will seriously limit the effectiveness of incentives to cut costs and improve efficiency. Paradoxically, since the tariffs charged by the West Siberian Railway are in effect driven up by the higher costs of the Moscow Railway, the cost of the railway charges to ship Siberian coal to major Western

Russian markets is actually higher than it should be, which defeats the stated objective of trying to support coal production in Siberia.²² It also follows that the tariff payments received by the Moscow Railway are probably lower than needed to generate adequate revenues. In both cases, carriers are making inefficient decisions. Most important, uniform tariffs will seriously limit the ability of RZhD to compete in the specific markets that will evolve in Russia as manufacturing industry restructures and competition from trucking intensifies.²³

The overall level of tariffs is designed so that revenues cover the total costs for the railways of transport, maintenance, renewal and expansion (and, at least at present, so that freight revenues cross-subsidize passenger services). However, achieving cost coverage will become increasingly difficult as competition from road haulage intensifies for the higher value categories of freight, as long as averaging of freight tariffs is maintained for the purpose of balancing regional development and favouring particular commodities.

It is not the purpose of this report to try and indicate whether tariffs for particular freight movements are too high or too low. The point is that Russian Railways will operate inefficiently, with real costs to producers and consumers, if charges for shipping or for infrastructure access are calculated without accurate and location-specific cost information.

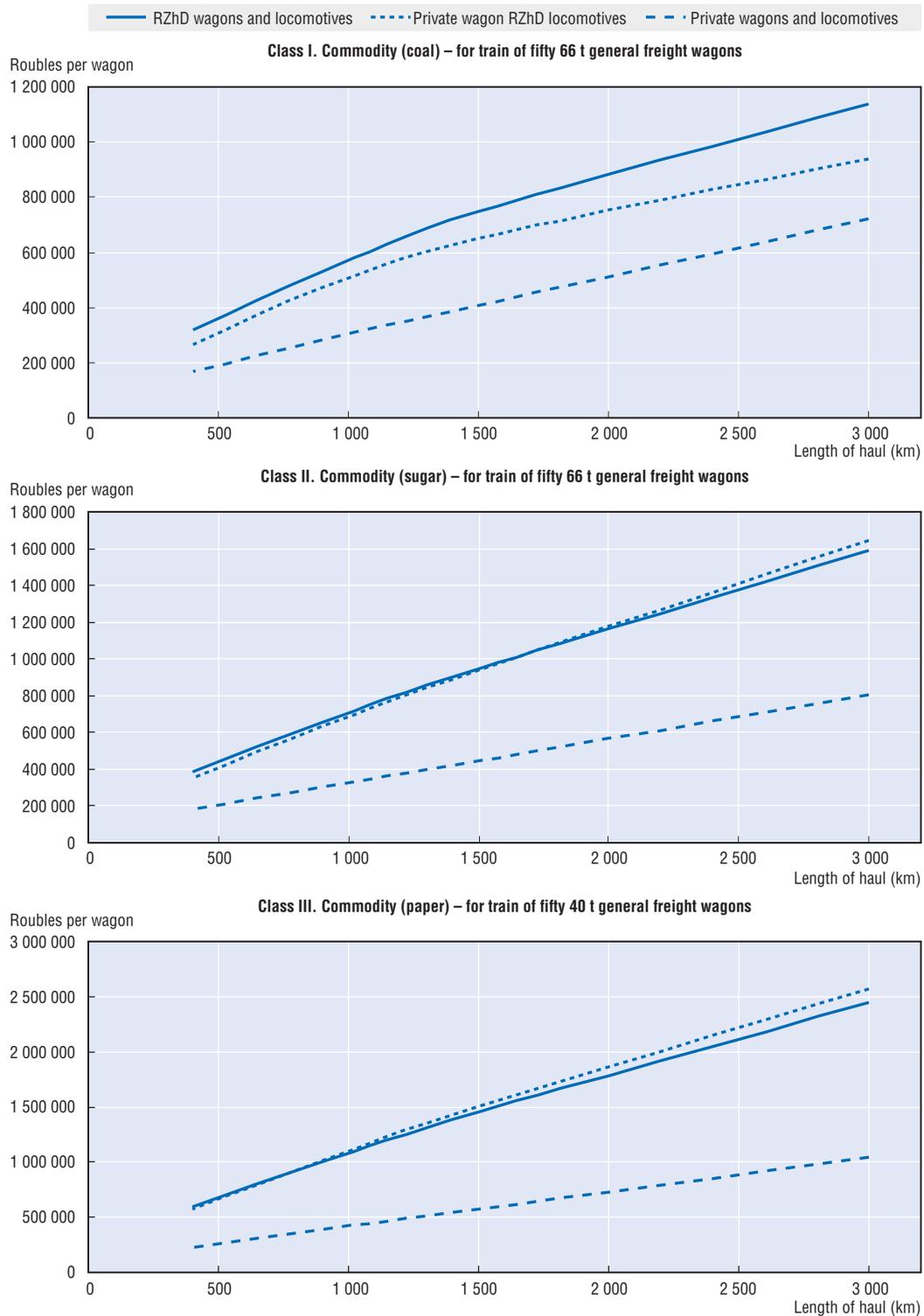
Cost structures

The most recent revisions to the domestic freight tariffs have introduced differentiated tariffs for shippers that provide their own wagons and for shippers that use their own locomotives. These act to provide a discount for shippers that provide their own wagons and a larger discount for those that provide both wagons and locomotives. The difference in tariffs are designed to correspond in part to the national railway's estimated average costs of providing and operating rolling stock, as distinct from costs related to infrastructure, diesel oil, electric power etc. The resulting structure of charges is illustrated in Figure 4.6. To derive the final differences in tariffs that result, appropriate empty return wagon run rates have to be applied. The average empty return run rate for RZhD across all traffic is 60%, and this figure is generally employed to establish the internal charge for RZhD. For private operators a 100% empty return rate is assumed. If the private operator can improve on this in practice he can enjoy a tariff advantage by using private wagons. This choice of load factors is deliberate to ensure charges do not discriminate in favour of RZhD wagons. In some specific markets where 100% empty return rates are the norm, as for example with oil tankers, the rate for using RZhD wagons is adjusted upwards to account for this.

For Class II and Class III commodities, the tariff including use of private wagons is actually higher than using RZhD wagons, based on the assumption of a 60% empty return ratio for RZhD wagons versus a 100% empty return ratio for the private wagons (and ignoring for the moment the specific markets mentioned in the previous paragraph). This is a significant barrier to overcome. It is especially significant for specialized wagons (higher purchase cost, high-productivity wagons made of aluminium, for example) operating in unit trainloads which, almost by definition, return empty. The key to running a successful business as an independent rail operator for Class II and Class III commodities is therefore in achieving higher wagon utilisation rates than RZhD. Independent operators therefore will seek customers that ship large quantities of freight between a limited number of points of origin and destination in order to be able to organise train-load movements with minimal requirements for marshalling. Private operators design services that minimise delays, working within the constraints of RZhD, for example changing routings to relieve RZhD bottlenecks where this is possible. They work closely with RZhD,

Figure 4.6. **Tariff charges for operators using private and RZhD rolling stock**

Based on diesel locomotives and standard empty return run rates:
RZhD 60%; other operators 100% – see preceding paragraph



Source: MPS/RZhD.

with offices in RZhD yards and stations, often employ former MPS staff and typically contract with RZhD for wagon maintenance and other services. Private operators therefore concentrate on niche markets and are often mainly own-account transport companies, and will be at a disadvantage in system-wide competition.

The Table 4.5 illustrates the significance of the infrastructure charges in a different way. The tariffs for use of private wagons and locomotives range between 38 and 64% (depending on commodity and distance) of the full tariff using RZhD locomotives and wagons. Comparison with average cost ratios in North American railways (see Figure 4.7), where conditions are not too dissimilar to Russia, suggests this allocation may be appropriate for wagon and locomotive costs; but, by leaving all other costs in the monopoly infrastructure charge rather than identifying additional and more precise cost categories, it almost certainly allocates far too much to infrastructure. Other operators will have to pay the remaining costs despite potentially being able to operate more efficiently than RZhD. Tariff list 10-01 has been modified to identify some additional services provided by RZhD for separate payment but developing this route to yielding access charges stripped of non-essential services still arrives at charges that bear little relation to costs because they are based on average costs for the network. Thus, as already noted, a shipper in relatively low cost Siberia will be paying charges designed to reflect Moscow Railway's relatively high costs. Moreover, an operator with much higher crew utilization than RZhD would be unable to realize the savings in lower infrastructure access charges.

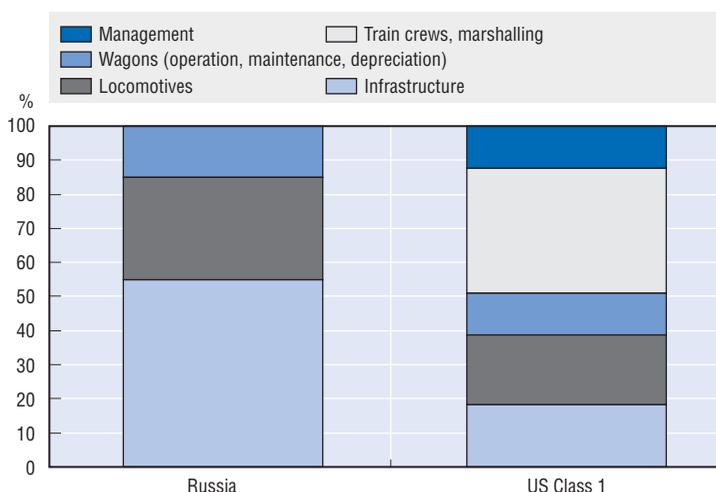
If new freight carriers are to enter the Russian market and compete with RZhD in all markets, as foreseen in the reform programme, then the team suggests that the tariff

Table 4.5. Tariffs for trains of shipper-owned wagons and locomotives as a proportion of the tariff for a standard RZhD railway shipment (%)

	400 km	900 km	1500 km	3000 km
Class I Cargo	53.3	52.9	54.7	63.5
Class II Cargo	46.7	46.1	46.8	50.6
Class III Cargo	37.9	38.3	39.3	42.9

Source: MPS/RZhD.

Figure 4.7. Allocated distribution of average railway costs



Source: Ministry of Railways; Louis S. Thompson on the basis of AAR data.

structure be more clearly divided into charges for those services which the infrastructure part of RZhD is required to offer in a non-discriminatory way as distinct from the services to be offered by the freight operators, including the RZhD freight operator. The services that should be provided without discrimination include access to and use of infrastructure, use of wagons, use of locomotives including, at the new carrier's option, crews and energy. The freight operators need freedom in the way they procure and charge for the provision of operating crews, wagon and locomotive maintenance, operations planning and management, marketing, etc. The monopolistic component of the services provided by the infrastructure provider should be reduced to the absolute minimum: to the greatest extent possible carriers should have full freedom to provide services for themselves and the RZhD freight carrier should not have preferential access or prices for any services. If new operators are to be able to compete, they must be able to take responsibility for a much wider spectrum of cost components, over which they can seek to achieve efficiencies in competition with Russian Railways.

The main innovation in the August 2003 revision to the freight tariff schedule is the establishment of separate charges for infrastructure use and the use of wagons, each in two parts (part fixed, part related to distance), all of which are commodity dependent. They are, therefore, not comparable with charges for the use of infrastructure in Western Europe, which are designed to relate charges to costs of infrastructure use only. This innovation is nevertheless designed to pave the way for the separation of infrastructure management from train operations envisaged in the reform programme.

4.3.2. Competition and pricing for the use of infrastructure

Pricing structures and efficiency

The economic argument in support of marginal costing for rail infrastructure access is well established, but it makes several crucial assumptions which, if not true, can change the argument. First, it is based on the belief that governments will reliably pay the fixed costs, every year, on time, and in the full amounts needed. Experience shows that this assumption is rarely true over any significant period of time. A second issue with marginal cost pricing is that there is little agreement on how to actually calculate marginal costs. In most cases, the source data on rail infrastructure costs maintained by the railway do not support a fully detailed analysis of the relationship between use and cost changes. Moreover, the calculation of "marginal" is critically related to the time frame: virtually all rail infrastructure costs are "fixed" in the very short term (i.e. the next train or the next wagon load), but become quite variable with use in the mid-term (two to five years or longer). The real question is, which cost measurement is needed for the decisions to be made? A single wagonload shipment would appropriately use short run marginal cost: a 20 year contract to haul millions of tonnes per year would use Long Run Variable Cost as a basis for pricing of both access and the tariff to the shipper.²⁴

Perhaps the most important issue in marginal costing of rail infrastructure arises when capacity is being reached. When the infrastructure nears its capacity, an extra user begins to cause delays for all other users (and itself) and the "marginal" cost of serving the extra user becomes high. In the example in the accompanying box, on a line approaching its capacity the cost of adding an additional ton-km (or passenger-km) might rise well above 10 Kopecks/tonnes-km and, as capacity is strained, might rise well above one Rouble per tonne-km. In fact, this is exactly what happened in the United Kingdom when the traffic on the Railtrack network grew rapidly after private carriers took over from British

Box 4.2. Efficient infrastructure pricing

The basic economic issues of infrastructure pricing can be summarised with a simplified example (they are discussed in technical terms in Annex A). Imagine a rail infrastructure enterprise with total annual costs of 100 roubles. This infrastructure is expected to carry 100 tonne-km in the next year. The total costs of the facility are composed of fixed costs (costs that do not vary with the level of traffic – classical examples are amortization, signal maintenance, weed control on the tracks, etc) and marginal costs (costs which do vary with the level of use). Assume the fixed costs are 90 roubles per year, and the marginal costs 10 roubles per year. In this case, the average cost per unit of traffic would be one Rouble per tonne-km, and the marginal cost would be 10 Kopecks per tonne-km. The infrastructure enterprise can cover its costs fully by either: 1) charging its users 10 Kopecks per tonne-km and looking to someone else (the government) to pay the remaining 90 roubles; 2) charging its user a 90 Rouble fixed fee* and 10 Kopecks/tonne-km (this would be a form of “two-part” tariff); or, 3) it can charge its user one Rouble per tonne-km and no fixed fee at all.

Economic theory demonstrates that approach one is more efficient (output maximised at the least resource cost in total) than approach two, which is in turn more efficient than approach three. In approach one, marginal revenues from access charges can be made equal to the marginal costs of using the infrastructure and the operator will make optimal use of the facility. In option two, after the operator pays the initial fixed charges up front (which might limit the number of potential users) the operator still sees an additional cost of only 10 Kopecks per tonne-km, so should still have the flexibility of charging only marginal cost to those shippers who can only pay marginal cost access fees. In option three, paying one Rouble per tonne-km would discourage any use for which revenue from customers of the train operator falls between 10 Kopecks and 1 Rouble per tonne-km. Moreover, the risk exposure of the infrastructure manager is increased because infrastructure income would vary directly and only with traffic levels.

* If there were two or more users the fixed fee would be split between them.

Rail. The operators were paying the equivalent of 90 roubles up front and then a total of 10 roubles annually for running trains.²⁵ The operators thus had an incentive to run all trains on which the revenue exceeded their marginal access cost, and they did so. Unfortunately, as increased traffic began to cause congestion, Railtrack was collecting far less from operators than it cost Railtrack to provide the added infrastructure services, and was not collecting enough at the margin to finance an increase in capacity. Congestion is a marginal cost, and should have been translated into substantially higher marginal charges – although actually making the detailed calculation would not have been straightforward. Infrastructure pricing, especially the marginal component, can have perverse effects when incorrectly applied.

Collecting the fixed costs of infrastructure from users

Although EU Directive 2001/14/EC recommends that rail infrastructure managers base infrastructure use charges on marginal costs, with remaining support coming from government sources, it recognises that countries might, for a number of reasons (including some of the above considerations), want to develop access fees that collect a higher share of the financial costs from users. So long as the resulting access fees are “non-discriminatory”, the Directive raises no objection to charging fees that are above strictly marginal cost when a country chooses to do so.²⁶

Unfortunately, the word “discrimination” has several meanings (although in Russian it is generally employed in a narrow, pejorative sense, in English, French etc. it has many meanings). Much damage can be done through imprecise use of the word. Very briefly, the social and political (and thus, legal) use of the word refers to the application of unacceptable prejudice or preference. Discrimination between persons for reasons of race, gender or nationality is generally discouraged. Charging a higher ticket price for a French passenger than for a German passenger on a Lufthansa flight purely because one passenger is French would not be acceptable on political grounds. In railway terms, the equivalent question – can the French infrastructure manager (RFF) charge a German operating company more for track access than a French company purely because one is local and the other not – is a primary concern for the European Commission in developing a single rail market for the EU. National champions supported by their governments in trying to exclude other EU railways from their home markets through the way regulations are designed and implemented, rather than competing in the market, is anathema to the Commission because of the damage it does to development of the single market. Similarly, European law has ended the German Government’s practice of arranging low tariffs for rail freight services to the port of Hamburg and high tariffs connecting to the port of Rotterdam, purely to encourage DB Cargo to use Hamburg. In general, this kind of “discrimination” based on unjustifiable prejudice or preference should be discouraged.

The economist’s use of the term “discrimination” is not necessarily so value-laden. Charging a different access price because of a different cost to serve is not discrimination at all. High-speed tracks cost more to operate than conventional lines, and higher prices for access should be charged. Running a train during rush hour when capacity is strained costs more than a train in the off peak, and access prices should necessarily be higher (though governments are often reluctant to follow this advice when their publicly financed suburban carriers have to pay the higher access costs that rush-hour services require). The costs of serving a small carrier running one train per day might not be much different from those of serving another carrier running ten trains per day: if so, then the access costs per train-km and per tonne-km might properly be higher for the small carrier than for the large carrier. Truly cost-based access prices are not “discriminatory”, and ignoring the distinction (in order, for example, to promote social or political objectives) will inevitably result in economic inefficiency.

The question that must be addressed, however, is how to charge for the non-marginal costs that, by definition, do not vary with use and often cannot accurately be assigned to a particular use or user. In practice, making users pay fixed costs is an exercise in more or less arbitrary allocation that has troubled railways, and their regulators, for many years. In the old US regulatory system, the Interstate Commerce Commission (the ICC, which has now become the STB) used three alternative methods for allocating fixed costs: per cent of wagonloads and wagon-km, per cent of tonnes and tonne-km and per cent of revenue when it was judging the fairness of a tariff. Each approach yielded a somewhat different answer (coal, for example, tends to generate a large number of tonnes and tonne-km, but relatively less revenue, so coal would carry a higher share of fixed costs under the tonne and tonne-km allocation than under the revenue allocation) leading to endless argument and litigation. Other railways have developed similar methods of cost allocation, none of which is satisfactory because the problem, by its very definition, is insoluble.

If the question is changed, however, to ask how access prices could be set to pass on fixed costs to users, rather than trying to develop a precise mathematical formula to

calculate cost responsibility, there is an answer. The answer, often called “Ramsey-Boiteux Pricing” after the economists who first articulated the idea, is that the least economic distortion is caused in passing along fixed costs to users when the prices to each user both cover at least the marginal cost of serving that user and reflect the price elasticity of that user. If the objective is to collect both marginal and fixed costs from infrastructure users, then the approach to setting prices most efficiently is to discriminate among users in relation to their ability to pay more than others. This kind of **economic discrimination** is both efficient and important: deviation from the principle, for whatever reason, has an economic cost. It also forms the basis for the fully developed, market-based regulation of rail freight tariffs in the US and Canada, where there are remnants of market power. No shipper pays less than marginal cost, and all shippers pay in relation to their individual price elasticity. Note that, in principle, Ramsey pricing can be applied at two distinct levels: for access to infrastructure; and also in determining the prices that the carriers charge to the ultimate customer (the shipper or the passenger). Because it will have both separated infrastructure and freight carriers with potential market power, Russia faces **both** levels of the issue.²⁷

Ramsey pricing for access charges can be applied in a set of access prices per tonne-km, with different prices charged to different train operating companies depending on their elasticity of demand for access. It can also be set up – perhaps with greater transparency and less danger of favouritism – as a “menu” of two-part charges, a variant on the “two-part tariff”. As mentioned above (and to return to the numerical example in the box), one problem with charging 90 roubles for the right to use the track and 10 kopecks per tonne-km is that some potential train operators may be discouraged from using the track at all by the 90 rouble fixed fee. Since, as noted above, the question of the source of payment of the 90 roubles for the fixed track charges is essentially an arbitrary one, it could be inefficient to deny access to such operators, assuming that the benefit that they derive from using the track is at least 10 kopecks per tonne-km. A solution used by some train infrastructure companies (and companies in other sectors with similarly large fixed costs to cover) is to post a “menu” of two-part tariffs, and allow companies to reveal their value of track usage by “self-selecting” their favoured menu option. For example, a small operator might be allowed to use the track for a small or even zero fixed charge, but then be required to pay a higher variable charge (somewhere between the 10 kopecks marginal cost and the 1 rouble average cost). At the beginning, these two options might be all that were required, but eventually, as smaller train companies grow larger, intermediate menu options might be made available as well, so that a train operating company could “buy” its way to a lower variable charge by paying a higher fixed charge. Such a menu of two-part tariffs is more economically efficient than either option 2 (the single two-part tariff) or option 3 (average cost pricing), while allowing the infrastructure company to rely less on state financing than does option 1 (marginal cost pricing).

In summary, access charges pose two broad choices: first, should the charging system be based on an arithmetic allocation formula (ensuring some arbitrary allocations if fixed costs are to be recovered) or should it be based on Ramsey pricing principles; and, second, should the charge be based on some simple and average measure of use, or should it have several parts reflecting a fixed charge and a charge that varies with use.

As with regulating the tariffs for shippers, the complications inherent in setting access charges are a good reason to create a system that allows competition rather than regulation to do the job wherever possible. One advantage of creating vertically integrated

train companies is that such companies set their access “charges” internally and perhaps even implicitly. They compete with other companies for traffic at common points, and they may face regulation for tariffs to captive shippers, and in both cases they must rationally “charge” themselves access “charges” that cover variable costs and contribute to fixed costs but do so in a way that distorts final demand as little as possible. The more that competition can be created, and the more that access charges and tariffs can be determined by competition and by private rather than government decisions, the better.

The accompanying table illustrates these choices, and all have been used in practice. Simple, arbitrary formula allocations have been used in the US and Canada to price trackage rights agreements (for example, a flat charge of 25 US cents per wagon-km), and they are currently in use in cases, like China, where the current access pricing is for accounting separation purposes and there is currently no commitment to competition on the same tracks. Multi-part, arbitrary allocation approaches are quite common for electric utilities and they formed the basis for the DB Netz access charges instituted before review by the German anti-monopoly agency simplified the charges. This type of approach is also found in the infrastructure access pricing regimes in France and Belgium, among others. Simple Ramsey pricing is prevalent in US and Canadian rail freight tariffs but has not been applied in rail infrastructure access pricing. Multi-part Ramsey pricing was originally the proposed basis for the Railtrack freight access charges in the United Kingdom; in fact, the original Railtrack approach attempted to charge different freight access fees in accordance with the commodity in the train, and a remnant of this approach remains in the current access charge regime for freight.

Table 4.6. **Choices in recovering fixed costs**

	Simple	Multi-part
Arbitrary allocation formula	Divide total costs by a measure or measures of use. Set fees accordingly. Example: charge one Ruble/train-km for all trains.	Carriers pay a two (or more) part tariff, one part related to marginal cost of use, and one which contains a formula-based allocation of fixed costs. There can also be a menu of several two-part tariffs. Example: all carriers pay ten kop./gross tonne-km plus 50 roubles/year.
Ramsey pricing	All carriers pay in relation to demand elasticity. Example: passenger trains pay 11 kop./gross tonne-km, freight trains pay 150 kop./gross tonne-km, suburban trains pay 110 kop./gross tonne-km.	All carriers pay their marginal costs, fixed costs are allocated by demand elasticity. Example: freight pays 9 kop./gross tonne-km plus 30 kop./train-km, plus 40 roubles/year: passenger trains pay 20 kop./gross tonne-km plus 50 kop./train-km plus 50 roubles/year.

Note: Numbers in examples above are all hypothetical, and are for illustration only.

Source: Louis S. Thompson, World Bank.

Discrimination in practice

Lack of adequate information to make good decisions. Decisions are rarely better than the information they are based on, and a failure to require disclosure of essential information cannot be rectified through intervention in other areas. This suggests that, no matter what the short-term structure of the rail system is in Russia, a maximum effort is needed to upgrade the information about the costs of infrastructure available to the railway and to regulators. It is also important to make this information available to the public and to the academic community in order to foster constructive debate. In the US, for example, the STB demands and publishes extensive information about each of the larger (Class I) railroads (the Form R-1). In addition, the Association of American Railroads

publishes (and sells) extensive financial information about their (Class I) members. Finally, the Securities and Exchange Commission (the regulator for financial markets) publishes detailed financial data and requires the data to be published in the Annual Reports of the carriers and in so called 10-K Annual Reports.²⁸ Russia would benefit greatly from making similar information available for public discussion and debate.

Corruption. As a general rule, corruption becomes a major problem when the incentives within the system are unclear. Corrupt discrimination can be attacked through proper structure of the access regime, through clear and enforceable regulation and, of course, effective law enforcement; but, the best approach is to make the rules of the game clear (often by simplifying them) and consistent.

Favouring affiliated companies. In principle, the access regime could be designed so that all train operators pay the same price and have equal, non-discriminatory access. In the world of railways, however, if the infrastructure manager wants to discriminate in favour of an operating partner (if it has one), it will be able to do so, no matter what the access rules and prices say. The tools are well known: manipulating the dispatching priorities, declaring that there is no capacity available, excessive “safety” inspections and unreasonable technical standards among many others. Regulation and enforcement cannot fully prevent this type of potential discrimination and, even if they could, potential entrants would always be discouraged by the threat of favoured treatment. One effective approach, discussed in detail in Section 4.2.2, could be to leave the freight and infrastructure integrated, but divide the infrastructure between vertically integrated rail freight companies. This would create line versus line competition between integrated carriers (the North and South American approach). An alternative approach, as discussed in the Reform Plan, is separation of ownership between public infrastructure and private carriers so that the infrastructure provider has no incentive to favour any carrier over another.

Favouring national companies. This is the primary concern for the European Commission in developing a single rail market for the EU. Access rules and regulation will not suffice (indeed, they have often been structured precisely to support national discrimination and exclusion): complete institutional separation will help, and private ownership of the carriers would also help.

Favouring large over small companies. DB Netz previous infrastructure charging regime used a two part tariff with a relatively large fixed component. This was ruled anti-competitive by the German Federal Cartel Office. One could argue whether DB Netz access charges were actually intended to favour DB Cargo over others, but the requirement that any carrier pay a large fixed charge in addition to a marginal use charge had the clear effect of limiting access only to those large companies that could pay a significant fixed charge.²⁹ The same was true of the freight access pricing regime that Railtrack initially instituted. Simple formula access charges will reduce this problem, but at the cost of economic efficiency. Multi-part charges can correct the inefficiencies, but they create the opportunity for manipulation of the results. Striking the right balance is not easy and a decision will need to be made whether to err on the side of economic efficiency or of promoting small new entrant carriers. But as noted in the preceding section of the report, a menu of tariffs providing a range of combinations of fixed and variable charge might offer a reasonably non-discriminatory way of distributing fixed costs between operators of different sizes.

Favouring existing over new companies. Another objective of the European Commission in its Directives is simply to ensure that the infrastructure manager does not set prices which are aimed at protecting the existing carrier by freezing out new entrants.

Political. The opportunities for politically inspired discrimination are unlimited. Pressures to favour particular constituencies or regions, to allow commuter trains to travel below cost without compensation, to favour Russian ports at the expense of competing Baltic ports, and many others, could all find their way into infrastructure charges. If the infrastructure entity is only recovering its marginal costs, then it will have no defence against pressures from those who provide the remaining money (which is actually an argument that full cost recovery access pricing approaches may promote efficiency). Full cost recovery access charging approaches create an incentive to charge more efficient and less discriminatory (in the political sense) prices. In regard to passenger services, explicit subsidy agreements for public service (PSO contracts) also bring clarity into the provision of social services.

4.3.3. Regulating the tariffs charged to the railway customer

Suburban passengers, intercity passenger services and freight

Access prices for infrastructure are only a part of the picture – we also need to account for the prices shippers and passengers pay to the operating companies. In broad terms, this breaks down into three different questions: suburban passengers, intercity passengers and freight.

Suburban passengers. Suburban passenger services lose money almost everywhere, and Russia is no exception. The EU is moving to require that such “social” services be provided under contracts in respect of public service obligations (PSOs) between railways and government and in the future European law is expected to require that these contracts be open to competitive tendering. They already are in the United Kingdom, Italy, Germany and Sweden. PSO contracts usually define the services to be provided and the tariffs to be charged and, as a result, regulation of the tariffs is through contract enforcement.

In the United Kingdom, for example, the Strategic Rail Authority (SRA), as the specifier of services and the contract manager, controls only the standard tariffs (season ticket prices for commuters and non-booked tickets for long distance trips, each type limited by a price escalation formula) while the large range of demand sensitive tariffs (first class surcharge, booked tickets for long distance trips, all short distance trips not using season tickets) are not directly regulated. The infrastructure charges paid by the UK passenger train operating companies (TOCs) are not entirely independently determined because the Government pays an operating subsidy and a large part of this goes to pay the infrastructure charges. In this case, the issue of Ramsey pricing is unclear since access charges are effectively moving from one pocket of government to the other and it is difficult to say what the price elasticity of demand for government really is. This issue – the role of Government as both purchaser of infrastructure access services as well as a subsidizer of carriers (notably suburban passengers, but also in other areas) – will be a regulatory issue for Russia as well as in the EU.

Intercity passenger services. The question of regulation of intercity passenger tariffs is more complex. First, a large percentage of the passengers on Russian intercity trains currently travel under advantaged or privileged fares and it is not clear what would happen if those fare reductions were eliminated. Second, for the other passengers, it is not clear

what degree of market power the railway carriers actually have. For longer haul markets, airlines should have a strong competitive position and it is less likely that the rail carriers have significant market power to abuse. In shorter haul markets, buses and cars are more competitive (and will be more so as highways are built or improved). Moreover, if government decides to create competitive carriers for intercity passengers, the need for tariff regulation can be reduced. The possible creation of competition in the intercity passenger sector in Russia is discussed in more detail below.

Freight. The regulatory regime for freight tariffs is going to be a crucial issue in Russia, given the very high share of freight tonne-km carried by rail. Although trucking is already becoming an effective competitor for freight in European Russia, it is not likely that there will be effective intermodal competition for rail freight transport in Asian Russia or for many bulk cargoes in European Russia. Control of the abuse of potential market power by rail freight carriers will therefore be dependent on either the creation of rail versus rail competition (mostly on the same tracks except, possibly, in European Russia where competition between integrated companies would be possible) or by regulation (or both).

As the next table shows, even if there is a perfectly “efficient” solution of the infrastructure charge regime, issues of discrimination in pricing will remain because rail infrastructure costs are only between 20 and 30% of total operating costs. In the US (the only country for which reliable, detailed data are readily available), rolling stock costs are about the same as infrastructure costs, and rolling stock fixed costs (depreciation plus leasing) are currently around 60% of total rolling stock costs. Carriers who own (or have financial leases for) rolling stock and who pay significant fixed charges for infrastructure will have to face the issue of passing on fixed costs to their customers; and, even if the infrastructure access charges do not include a fixed component, the fixed costs of rolling stock alone will still be significant in the customer pricing calculation. Thus whilst independent carriers who rent RZhD rolling stock will see the rental charges as marginal costs to be passed on to customers in marginal tariffs, carriers that own their own rolling stock will have a large fixed component in their costs and will have to engage in Ramsey

Table 4.7. **Infrastructure costs as a proportion of total costs**

	Per cent	Year	Source
US	17-27	2001	AAR
UK	25	1995	UIC
France	20.5	1999	UIC
Sweden	30.9	1997	UIC
India	10	2000	Annual report
Russia			
Freight	45	1999	MPS
Intercity passenger	20	1999	MPS
Suburban passenger	27	1999	MPS

Notes: US numbers vary depending on treatment of depreciation versus investment.

UK, France and Sweden are calculated as the ratio of the total cost of the infrastructure company (Railtrack, RFF and Banverket respectively) to the total cost of infrastructure and operating companies.

French ratio is low because much of the track maintenance is actually in the SNCF budget.

India taken from IR Annual Report. IR has been under-maintaining their infrastructure and has understated depreciation, which lowers their ratio.

The estimates for Russia are minimums. Actual percentages might be even higher.

Source: Louis S. Thompson, World Bank.

type pricing to recover it. The regulatory regime will have to make allowance for these two contrasting types of independent train operation.

Regulation of Charges for the use of other assets owned by the Russian Railways

The current policy that the infrastructure company in Russia will also own and provide locomotives and wagons for the operating carriers could add yet another level of complexity – and potential for discrimination – to the issue of access tariffs. There will clearly need to be regulation of the charges for locomotive and freight wagon usage, and many of the same issues of discrimination will arise on wagon and especially locomotive charges (should they be leased on a daily charge and charge/km, or annual lease, can the user lease one unit at a time, or must a fleet be leased in a single transaction, etc). Probably more important, access to locomotives, crews and wagons could be a powerful tool whereby the infrastructure provider could exert an influence over the competing carriers. This, again, could be of particular regulatory concern if there is an ownership or control relationship between the infrastructure provider and any of the freight and passenger operating companies. The playing field might actually be level, but it probably would not appear to be so and investors, especially external investors, are strongly averse to ambiguous, discretionary, or unpredictable factors.

The relevance for Russia of experience in regulating freight tariffs and infrastructure charges elsewhere

It will be critical to ensure that Russian rail freight tariff regulation is consistent with the demands of a more competitive, market-driven economy and is consistent with the incentives that are created by the Russian infrastructure access regime. Inappropriate, intrusive and unbalanced rail freight regulation came very close to bankrupting the railroad systems in North America,³⁰ and the circumstances for the same outcome exist in Russia.

In this regard, the railways in the EU occupy such a small freight market share (maximum 15% in most cases), and competition from trucks and water is so intense, that rail freight tariffs throughout the EU are essentially unregulated. China's rail freight tariffs are still completely embedded in their prior command and control system. They have only a few commodity classes, offer no contract rates, are nearly inflexible to cost circumstances or demand elasticity, and essentially vary linearly with weight and distance. In addition, the Chinese practice of adding a flat charge per tonne-km to finance construction of new lines further limits the rail company's ability to achieve market-sensitive pricing. The current Chinese regulatory model, while having the same roots as the past Russian approach, has little to offer Russia today. Because of the similarities in the market pressures on Russian and North American railways, the regulatory approach adopted in North America is highly relevant for Russian regulatory reform. The North American system reflects both the effects of a market system, including the need to recover fixed costs through tariffs while, at the same time, trying to deal with areas where railroads have market power.

This said, there are also lessons to be learned from countries where there is vertical separation of infrastructure. EU legislation, as already noted, provides for mark-ups above the basic approach of charging according to marginal costs, in order to recover costs where public financing is unable to cover them. This mechanism is highly flexible, although may require additional regulatory effort to determine when such mark-ups are justified.

As already noted, it is difficult to characterize the current Russian rail freight tariff system in terms of its economic effects. The new tariff schedule has a relatively simple set of commodity categories (three). In the absence of accurate costing information, it is not possible to tell whether the socially imposed tariffs on low value commodities (for example, coal hauled from Siberia to the West) are actually below their variable costs. Overall, one commodity class (manufactured commodities) probably does support the others (all of the cross-subsidies to passenger services must also come from the profitable commodity class as well). Some flexibility for demand responsive pricing, and some ability to develop contract rates is being introduced. The system simultaneously pursues a number of other objectives through schedules of coefficients applied to the basic commodity tariffs. Rather than attempting a detailed critique of the current system the purpose of what follows is to highlight some issues and questions that may be important as the Russian rail system of infrastructure and carriers begins to evolve.

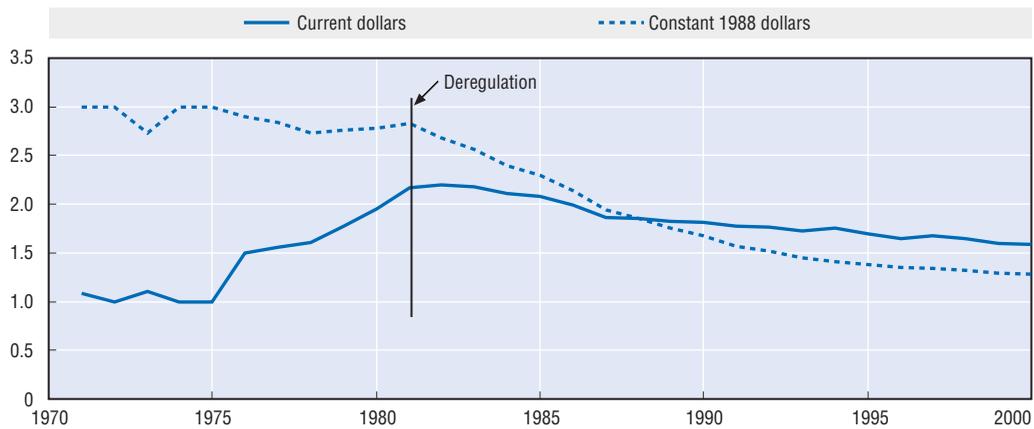
For about five years after World War II, the US rail system continued essentially on the momentum of the war years in which highway fuel was rationed and new vehicles were hard to obtain. Beginning in the early 1950s, though, when wartime production had been re-converted to peacetime purposes, auto ownership grew, truck fleets increased, highways were built, and the civil aviation industry began to develop. Especially after the advent of the Boeing 707 in 1954, and the start of the Interstate Highway System in 1956, the competitive position of the railroads began to erode rapidly. By the end of the 1960s, the privately owned rail network³¹ was nearing a financial collapse. The initial response of the US Government was to create Amtrak, the nationally owned intercity passenger rail carrier, in order to end the cross subsidy from freight to passenger services.³²

Although creation of Amtrak helped, the freight industry continued to suffer from the effects of adverse regulatory interference. For nearly 100 years, the ICC exercised its power to intervene deeply into freight rail tariffs, and this led to a system of politically imposed distortions in the rail freight rate structure that harmed the competitive position of the railroads and prevented them from being managed as commercial businesses in full competition with trucks and barges. Moreover, the regulatory system for trucks and for airlines had also become so obviously inefficient and expensive that the Congress passed, in rapid succession, deregulatory legislation for airlines (1978), then railroads (1981 – the so-called “Staggers Act”), and then trucks (1982).

The results of the three regulatory packages have been highly successful, certainly from the point of passengers and shippers. Freed from regulation, US rail freight tariffs fell significantly both in current and real terms, the rail market share stabilized, and productivity of labour and assets increased so quickly that rail earnings actually increased (though they are still arguably less than the cost of capital to the railroads, at least as calculated by the STB) (see the accompanying figures). Truckload tariffs also fell and rail and truck tariff decreases brought barge tariffs down with them, saving the economy tens of billions of dollars per year in transport costs. The greatest driver of the decrease in rail freight tariffs and the increase in productivity is believed to be the advent of contract tariffs which were prohibited prior to deregulation but which, today, appear to apply to more than 60% of all rail tonnage. Contract tariffs permitted railroads and shippers to invest in specialized facilities (rolling stock, loading and unloading facilities) and commit to stable volumes to be shipped: this, in turn, rapidly boosted efficiency. These contract tariffs, being voluntary agreements between railroad and shipper (shippers can always resort to a public tariff if they wish), are generally not public and they are not subject to regulation at all.

Figure 4.8. **US rail freight revenue**

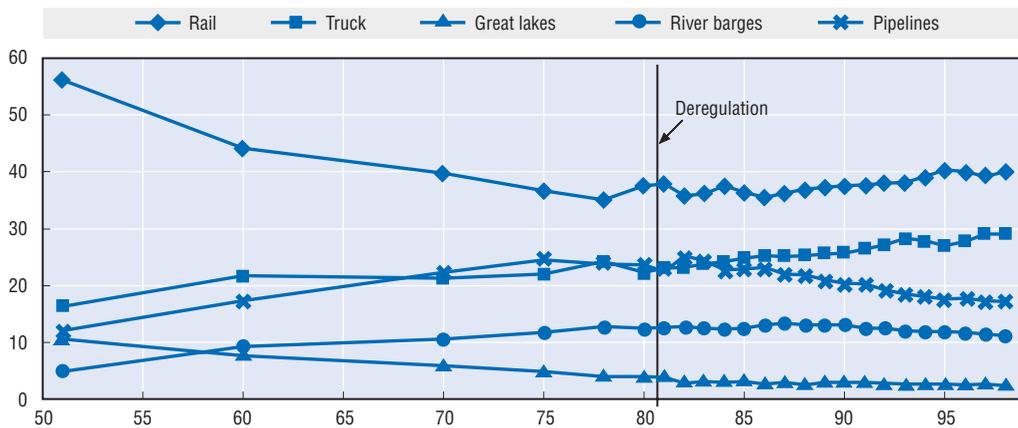
US cents/tonne-km



Source: AAR Handbooks of Railroad Facts.

Figure 4.9. **Freight modal shares in the US**

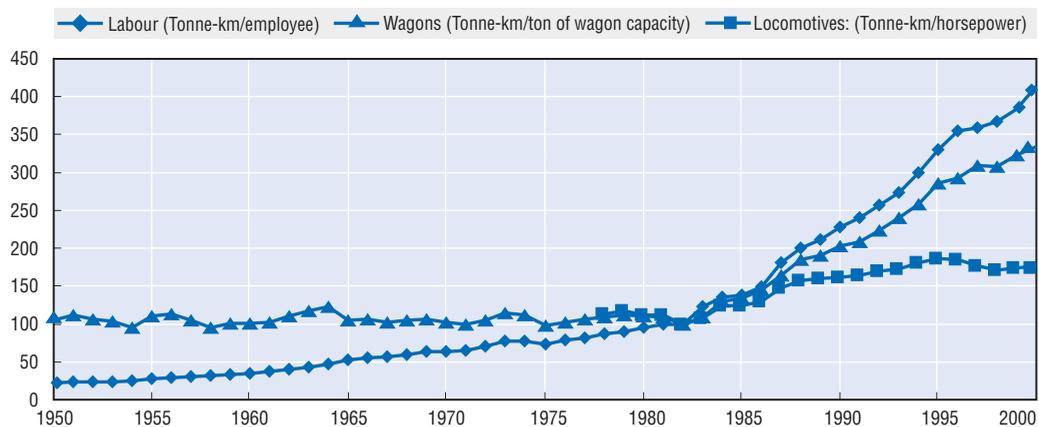
% tonne-km



Source: Louis S. Thompson, World Bank.

Figure 4.10. **Productivity in US railroads**

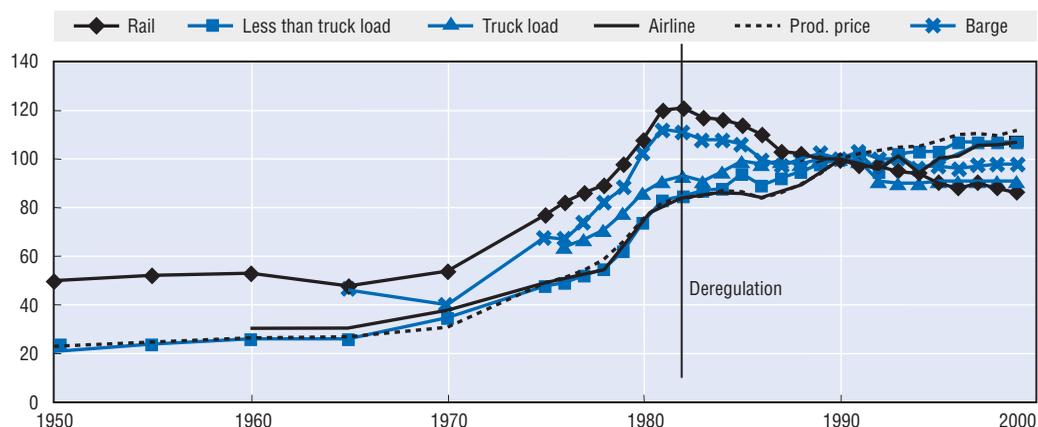
Index: 1982 = 100



Source: Louis S. Thompson, World Bank.

Figure 4.11. Average US freight and airline tariffs

Index: 1990 = 100



Source: Louis S. Thompson, World Bank.

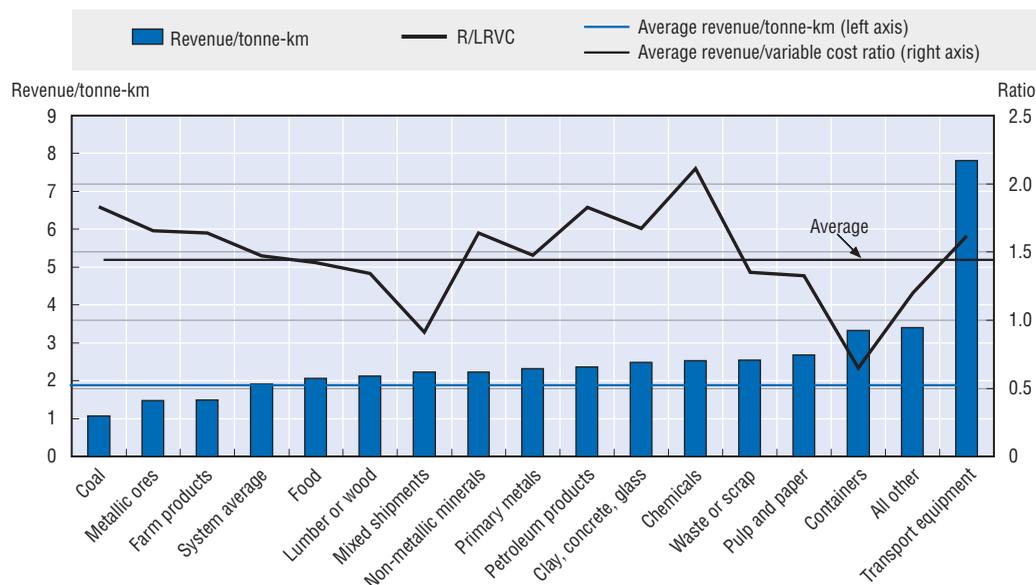
The principles behind the US rail freight regulatory system deserve consideration as the Russian system develops. In broad terms, the foundations of the US approach are:

- The presumption is that adequate competition exists, either from trucks, barges, other railroads, or competing sources, so that rail freight tariff regulation is normally deemed to be unnecessary. So long as the total earnings of a railway do not exceed the cost of capital for the railway, and so long as its total revenues from freight operations do not exceed a stated ratio (180%)³³ of its “variable costs”, the presumption of adequate competition is difficult for a shipper to challenge.
- When a shipper believes that a quoted rail tariff may reflect abuse of market power by the railway, the shipper has the responsibility to demonstrate that the railway *does* have market power *and* that the proposed rail tariff exceeds a ratio of 180% of its variable cost, or that the proposed tariff exceeds its “stand alone cost” (that is the cost of an efficient railroad providing service only to the shipper in question). If all these tests are met, then the STB *may* (but does not have to, and usually does not) prescribe a tariff that it considers reasonable.³⁴ None of these issues apply to voluntarily negotiated contract tariffs that are, for the most part, unregulated and confidential.

As a result of this approach, essentially no US rail freight traffic moves under prescribed tariffs, and little or none moves under a simplified commodity tariff grouping. Instead, virtually every shipment is unique, with a tariff specific to the circumstances (contract tariff, commodity, equipment type, railroad, distance, competition, etc). The net result can be seen in the accompanying figure for US railroad freight tariffs, which shows the variation in average revenue per tonne-km for the most important 15 commodities in 2001 (98% of tonne-km). As expected, the range of tariffs is quite broad. There is an attempted to compare this roughly with Russian practice in the next figure, which compares the Russian tariffs for the three major tariff groupings as represented by coal, steel ingots and wheat (tariff data provided by MPS) with the average tariff at the average length of haul for some of the major commodity groups in the US.

There are many caveats for this comparison, including the conversion of Russian tariffs into purchasing power parity (PPP) adjusted dollars; this said, it is significant that the

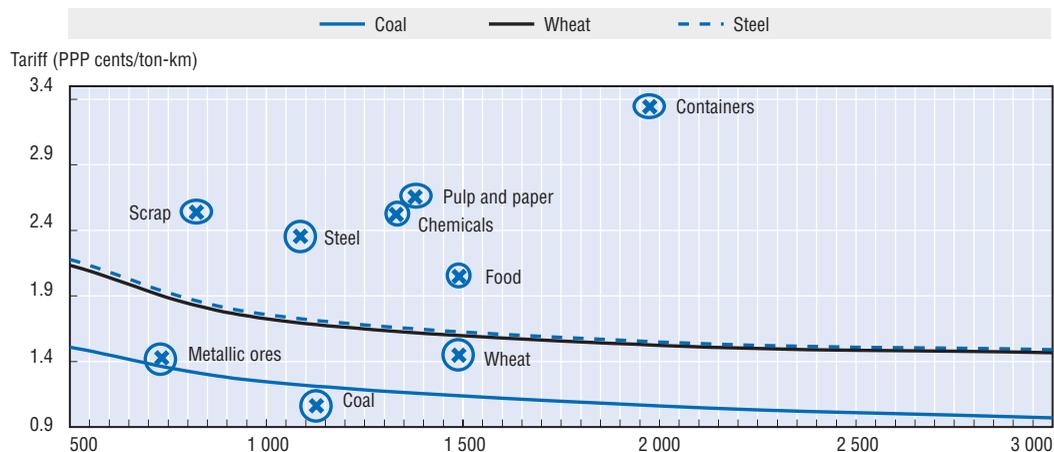
Figure 4.12. US railroad freight tariffs in 2001: Revenue/tonne-km (US cents) by commodity and ratios of revenue to variable cost



Source: STB data.

Figure 4.13. Freight tariff comparisons: US and Russia

Solid lines show Russian tariff schedule versus distance for 50 wagon train. Circled points show US average tariff for commodity chosen at average distance of haul for the commodity



Source: Russian tariffs from MPS, US tariffs from STB Costed Waybill Data for 2001.

US tariffs for these commodities show a significantly wider **range** of variation than the Russian tariffs as a result of greater flexibility to adapt to market conditions. Russian tariffs should never be the same as US tariffs because both competitive conditions and cost conditions are different; but the need for a wider range of variation than exists at present seems clear if the Russian freight carriers are to be able to fully cover their fixed costs in the face of growing competition. This will be particularly true if (as discussed below), limited market rail freight carriers are to be able to compete (“cherry pick”) with general cargo

railway carriers by using the public infrastructure to haul in-house cargos (e.g. a coal mine which elects to run its own trains from mine to power plant).

The difficulties in covering costs created by commodity tariffs could be multiplied greatly if charges for the use of infrastructure are commodity-specific and based on the same regulated end-user freight transport tariffs. If this happens, almost all of the ability of the carriers to engage in demand-sensitive pricing could be removed. This approach will likely benefit the infrastructure agency, but will make life difficult for the carriers.

The figures for the US also show the relationship between the revenue generated by the various commodities and the calculated “long run variable cost” (LRVC) to move them. LRVC is the approach used by the STB to compare the revenue in a proposed tariff with the appropriate cost of the movement in question. The approach can also be used, as in the figure, to compare the total revenues for a given set of traffic with its LRVC costs. The STB’s LRVC is not the same as the economist’s short run marginal cost: the LRVC concept was developed in order to use real-world data and in a longer run time frame that covers a period of several years, so LRVC is a higher percentage of total operating costs than are short run marginal costs. Two points emerge from this: first, costs of particular movements and aggregated movements can be calculated (at least approximately) and usefully compared with the revenues they generate; second, there is no direct relationship between the tariff on a commodity group and its profitability (see coal, where the average tariff per tonne-km is the lowest, but the ratio of revenue to variable cost is the second highest). There is no substitute for knowing costs as well as tariff levels if tariffs are to be regulated in a way that permits market-sensitive pricing.

It could be very important to subject the tariffs shown in Schedule 10-01 to the same kind of costing exercise as done by the STB in the US, and also laid down for the EU in Directive 2001/14/EC, to ensure that all Russian rail freight tariffs are at least covering their variable costs (questionable for the extremely long haul coal traffic due to the system of discounts with increasing distance of haul for this category of freight) and to identify circumstances in which the tariffs are far above costs. It would also be quite helpful to the Regulator to be able to compare costs with the tariff revenues.

As already noted, access rules and charges must be consistent with the regulation of the final prices charged to the shipper (or passenger). The reason for this is that, relatively quickly the infrastructure agency will come to understand that, if it is to cover its full costs, it must view infrastructure access as a *product to sell* – and it has a very limited set of customers. The second change is that, as soon as they become profit driven (and all enterprises with “hard budgets” are), then the freight and passenger carriers will view access charges as price signals, just like any of their other inputs. They will react to prices both in their level and their structure. In the short run, they will adjust the way they use the infrastructure; in the longer run, they will adjust all of the access charging variables under their control in order to maximize the distance between what they generate in revenue and what they pay in access fees.

Russia is in the process of creating a market for rail infrastructure services that will have an immediate impact on the behaviour of the carriers in the directly linked market for rail freight services. The interaction between the freight carrier(s) and freight shippers will clearly be affected by the prices and services the rail freight carriers provide (and, of course, by the prices and services offered by trucks and water transport and by the restraints imposed by the freight tariff regulatory regime). It should be equally clear that the

interaction between the infrastructure manager and its customers – the freight and passenger carriers – will also be defined by the infrastructure prices and services offered. Though the infrastructure manager is a “monopolist”, its customers are not monopolists, and they will have to react to the access charges they face. Just as the infrastructure agency will have to be mindful of the reaction of its users to its charges, so the infrastructure regulator will not be able to issue (or accept) commands to accomplish social or political objectives through infrastructure use charges without having a significant effect on the way the carriers perform and/or on the earnings of the infrastructure agency.

The overall argument is that all regulatory interventions, no matter how purely motivated, have consequences. Many countries have tried to impose cross-subsidies from freight to passenger services, or from one freight category to another, through regulation of tariffs: in every case, if the mis-regulated carrier has effective competition, market forces have frustrated the regulators and damaged the carriers. In the US case, in the period before deregulation in 1981, mis-conceived regulation nearly destroyed the private railroads. Countries have also attempted to make freight tariffs “fair” to small and remote farmers who believe that they should pay the same tariffs as larger farmers closer to markets. The result – overcharging the best customers in order to support the less profitable ones – has an inevitable outcome. Trucks get the best traffic and the railroad carrier is left with the less productive market.

A good example of the potential risk for Russia is the following. Assume that freight tariffs are regulated so that there is a relatively simple set of commodity groups. Let us assume that one of the commodities (for example, fabricated steel) carries a high tariff that the regulated freight carrier has no power to reduce and that the carrier has a prescribed, low tariff for iron ore and coking coal. If the steel tariff is high enough, trucks will be able to compete for the steel, and the rail carrier will be left with the less profitable, bulk commodities. If the track access regime is set up to be non-discriminatory as between large and small freight carriers, the steel mill itself may decide to haul steel and leave the railway to bring in the raw materials. In either case, the carrier, the steel mill and the economy are actually worse off than they would be if the access regime and the tariff regime were more flexible and adjustable to market forces. These are not hypothetical examples: these kinds of distortions are exactly what happened in North America in the period before the passage of the Staggers Act in 1981, and it has taken the better part of two decades to recover from the damage.

4.3.4. Conclusions on tariffs

Responsibly, the Government has taken pains to avoid shocks to the system. It has therefore preferred so far to preserve and gradually modify tariffs, rather than introduce a new system of tariff regulation in the midst of all the other reforms. However, there are risks to that approach as well.

Within the regulatory framework, the Russian Railways must be given the freedom to price their services according to the market. If they do not get this freedom they will lose their most profitable business to competition from road haulage and from industrial customers who decide to run their own trains. Within only a few years the capacity for the railway pricing system to contribute to governments’ regional development aims will disappear as Russian Railways sees its revenues decline. It will become increasingly difficult even to cover the railway’s own total costs, even if the costs of supporting suburban passenger services are transferred to separate government budgets.

The Three Class commodity tariff system should be replaced with a much more flexible system of regulation adapted to the market environment the Government is creating for the railways, and for the economy as a whole. Like RZhD, private railway companies, whether vertically integrated or only operating trains, will need the flexibility to set tariffs – subject to broad regulatory constraints in parts of the market where necessary – that cover costs but also allow the company to respond to competitive conditions and so keep high-value cargos.

Once a decision to move to more flexible pricing is taken, the Government will have to decide which if any of its goals should continue to be pursued through modifications to the existing tariffs, in the period before the new approach to regulation is formulated and adopted. The financial incentives that result from the new layers of differentiation introduced into the tariff system are difficult to gauge. The response of different parts of the rail sector as it undergoes legal and structural reform, with new freedoms for some parts of the industry, is even harder to predict. Some of these changes might accelerate the loss of traffic foreseen. They may also have unforeseen impacts on the allocation of resources to investments that are essential to maintaining the asset value of the system. Budgets for maintenance and renewal tend to be vulnerable to reduction in periods of change, or financial uncertainty that arises for any other reason. The overall risk is that when the time finally comes for reform of the tariff regulations the railways will have been overtaken by financial crisis.

As noted in the section on competition above, the regulatory task in overseeing freight tariffs would be greatly reduced if and where competition between vertically integrated freight railways can be established through appropriate adjustments to the structure of regional railways. Universal prescription of freight rates would be replaced by rates established through competition, with regulatory oversight, with a right of appeal to a regulatory agency in cases where customers believe they are victim of monopoly abuse. There would be few circumstances where oversight of access charges is required as for the most part they would be set internally and implicitly by the vertically integrated railway companies themselves. The rules according to which judgements are made will need to be devised according to the quality of data available to the authorities. It will be important that the regulator have both adequate information and economic expertise to make these judgements. The Regulator should be making economic assessments, not simply overseeing application of the letter of the law. Even without competition between vertically integrated railways, for many markets competition from road haulage will limit the market power of the railways (as is the case in most of Europe and the United States) and reduce the need for detailed prescriptive regulation, allowing some freedom for negotiated freight rates in place of tariffs, although a more prescriptive specific regulatory regime may be needed for coal.

The way charges for the use of infrastructure are set under the new arrangements depend in part on the model adopted for competition: whether new carriers operate on track owned by Russian Railways in competition with Russian Railways' freight division; or whether competition between vertically integrated companies is established over parts of the network. Where vertical separation is chosen, a two-part tariff is probably indicated, and perhaps a menu of two-part tariffs that seeks to achieve cost recovery while maintaining the ability of smaller companies to afford access. As the system is expected to cover its full costs, the charges will have to include a large element determined according to ability to pay, and this would be assigned to the fixed part of the tariff. The variable part

would be based on marginal costs of running particular trains. It is essential that infrastructure charges be structured to provide strong incentives to manage the infrastructure efficiently and favour train configurations and equipment that does not impose excessive wear on the tracks.

The role of the regulatory authorities in assessing the conformity of infrastructure charges with policy is somewhat different under the two models for competition. In the model set out in the Plan for the short term there may be a policy imperative for reducing the level of fixed charges paid by the smaller operators, or new operators seeking to enter markets where margins are small, as a way of helping to balance the many barriers to market entrance they will inevitably face.

The Commission for Tariff Regulation should begin to explore appropriate designs for end user tariff regulatory oversight in Russia and the design of charges for the use of infrastructure suited to the goals of competition policy as this becomes more clearly defined.

4.4. Passenger rail public service obligations and concessionary fares

Despite its larger scale, the Russian rail passenger services are similar to services in other OECD countries. They fall into two distinct categories – suburban/regional versus long haul/intercity. In 2002, MPS carried about 1.15 billion suburban/regional passengers and 121 million intercity passengers. The average suburban/regional trip length in Russia was 41 km (roughly the same as the average for all rail passenger trips in Germany), whereas the average long haul trip length was 876 Km (slightly longer than Amtrak, VIA in Canada, and China). These two distinct types of services have very different markets to serve, and very different cost and demand characteristics.

The distinction between suburban/regional services and intercity services has been well recognized and developed in most OECD countries. In most cases, suburban and regional passenger services are provided under socially controlled³⁵ fare structures, which cause them to operate at a loss. The European Commission has concluded that most long haul passenger services ought to be commercially viable and should not receive state support. It is an EU requirement that all social services requiring state support be provided under a contract between the appropriate government agency at the local, regional and/or national level. The contract must be supported by transparent accounts separating costs and revenues of each service, and the support must be adequate to cover the costs of the service provider.

The existing EU regulation (Regulation No. 1191/69/EEC) states that in order to ensure adequate transport services that take into account social, environmental and regional development factors, or offer special fares to certain categories of passenger, the competent authorities may conclude **public service contracts** with a transport undertaking. A public service contract may cover notably:

- Transport services satisfying fixed standards of continuity, regularity, capacity and quality.
- Transport services at specified rates and subject to specified conditions, in particular for certain categories of passenger or on certain routes.
- Adjustments of services to actual requirements.

Where a transport undertaking not only operates services subject to public service obligations but also engages in other activities, the public services must be operated as **separate divisions** meeting at least the following conditions:

1. The operating accounts corresponding to each of these activities shall be separate and the proportion of the assets pertaining to each shall be used in accordance with the accounting rules in force.
2. Expenditure shall be balanced by operating revenue and payments from public authorities, without any possibility of transfer from or to another sector of the undertaking's activity.

“**Public service obligations**” are defined as obligations that the transport undertaking in question, if it were considering its own commercial interests alone, would not assume or would not assume to the same extent or under the same conditions. Public service obligations consist of the obligation to operate, the obligation to carry and tariff obligations and should be granted **compensation** from the public authorities in respect of the financial burdens that result.

The European Commission has proposed amendments to this regulation with the following objectives: a) to stimulate more efficient and attractive public transport, through the use of controlled competition³⁶ and other measures; b) to promote legal certainty for authorities and operators. The proposal establishes common rules:

- For the use of contracts between authorities and operators.
- For compensating operators for the fulfilment of public service requirements.
- For the award of exclusive rights.
- For introducing and managing competition.
- On transparency.

Controlled competition in the countries of the EU is associated with more efficient and attractive public transport. The accompanying table compares trends in public transport in 30 large EU cities during the 1990s. Cities using controlled competition attracted most new passengers. They also had the best financial performance. Similarly, the two member States that made most use of controlled competition in heavy rail – the UK and Sweden – were those where passenger numbers grew fastest between 1994 and 1999.

The Plan and the legislation clearly call for an approach in Russia that is similar to the EU approach of having passenger support for social services provided under contract with the rail carrier. The Plan also recognizes the need for at least part of the support to come

Table 4.8. **The impact of controlled competition on performance of public transport systems**

	Annual rates of change	
	Numbers of passenger trips	Proportion of operating costs covered by fares
Cities using controlled competition	+1.8%	+1.7%
Cities without competition in public transport	-0.7%	+0.3%
Cities using deregulation without significant control by public authorities	-3.1%	+0.3%

Source: COM(2002) 107, final 21 February 2002, Amended proposal for a Regulation of the European Parliament and of the Council on action by member States concerning public service requirements and the award of public service contracts in passenger transport by rail, road and inland waterway.

from local or regional governments. The potential scope of the problem is shown in Table 4.7 which shows separately for long distance and for suburban/regional trains, passengers carried, passenger-km, estimated operating losses, and the ratio of the revenue from passengers to the operating costs of the services.

Suburban/regional services are concentrated in relatively few regional railways, with Moscow and St. Petersburg together accounting for almost half the suburban activity and losses. The total suburban losses (roughly estimated at 16 billion roubles in 2001, though all estimates of “losses” should be understood as approximate and probably calculated on a basis inconsistent with IAS standards), constitute a significant burden on the rail system,³⁷ and they are clearly absorbing earnings that could otherwise be generating badly needed investment resources. The program of moving quickly toward separating the suburban/regional operations financially and, as soon as feasible operationally, deserves high priority. Only through clear separation of accounts and operations can the needs for PSO relationships be fully justified. The table also shows that “losses” on the long haul trains are significant – larger, in total (about 30 billion roubles), than the suburban services but having a much higher ratio of revenues to operating costs and therefore closer to break-even.

Both types of passenger services suffer from the problem of revenue losses due to reduced fares (and, for suburban services, fare evasion). It has been estimated that 43% of

Table 4.9. MPS passenger operations in 2001

	Passengers carried (000)		Passenger-km (000 000)		Estimated operating losses (000 roubles)		Ratio of revenue to costs (%)	
	Long distance	Suburban/ regional	Long distance	Suburban/ regional	Long haul	Suburban	Long distance	Suburban/ regional
October	17 564	179 749	12 432	5 750	2 522 047	3 202 241	58.2	13.9
Kaliningrad	463	8 249	112	230	14 548	197 563	68.5	13.0
Moscow	28 003	548 564	17 472	17 158	4 465 148	4 630 169	52.5	30.0
Gorky	7 316	74 338	9 856	2 484	1 109 682	1 070 408	71.5	16.6
North	10 216	28 650	7 056	1 242	2 247 478	409 946	47.0	18.8
North-Caucasian	10 831	39 629	8 624	2 208	2 638 941	1 061 070	48.0	10.5
South-East	4 468	42 886	8 736	1 748	2 127 542	962 401	53.7	6.1
Volga	5 791	23 347	4 816	736	1 810 607	563 229	42.9	6.5
Kuibishev	6 828	38 299	7 280	1 656	783 900	588 829	72.4	18.7
Sverdlovsk	13 032	81 432	11 088	2 530	2 122 986	747 089	59.6	25.8
South-Ural	4 883	28 282	4 368	1 610	1 042 576	656 858	54.2	18.9
West-Siberian	8 862	112 746	6 720	4 876	1 860 553	533 307	50.5	26.4
Krasnoyarsk	3 992	17 052	3 024	644	936 535	343 855	47.7	12.3
East-Siberian	4 071	23 462	3 808	1 334	1 567 170	405 942	40.7	21.1
Baikal	3 922	13 098	3 360	828	2 152 466	268 087	30.6	10.2
Far-East	7 450	19 818	2 912	920	2 053 442	385 749	28.6	14.5
Sakhalin	768	719	224	0	245 369	29 075	20.5	10.5
Total	138 460	1 280 320	112 000	46 000	29 700 990	16 055 818	51.7	20.2

Sources:

Passengers carried: Deloitte and Touche, Table 8, p. 24.

Passenger-km: estimate based on Deloitte and Touche, Table 10, p. 35 showing percentage of total passenger-km by category, and data provided by MPS showing total passenger-km by long and suburban travel.

Ratios of revenues to costs: Deloitte and Touche, Table 11, p. 35.

Estimated operating losses: Deloitte and Touche, p. 19, and estimate based on the Deloitte and Touche revenue/cost ratios and revenues calculated assuming that revenue percentages for each railway are the same as their passenger-km percentages.

all suburban passengers travel on free or reduced fares (and another 10% are fare evaders). These fare reductions total about 6.8 billion roubles per year, which is a sizeable portion of the annual losses. Long haul services are not so affected by fare reductions, with about 14% travelling on free or reduced fare tickets (with very little evasion).³⁸

Based on experience outside Russia, and the differences in the two types of passenger service in Russia, separate models deserve consideration. For suburban services, separating the services and devolving them to local planning and at least partial local funding is a good approach. Because of the high percentage of privileged travel, and the high losses over and above the privileged travel losses, the EU approach of requiring PSO contracts for each service would be an effective way of ensuring that decisions about ticket privileges and overall services are made in the right place: clearly these services are far from potential commercial status, and a contract with local agencies to provide each service in its entirety will be more effective.

Practices vary as to the share of the suburban support that is paid by national governments and by local governments. The funding balance between national and sub-national authorities is usually determined in large part by the relative ability to raise taxes. Where local tax bases are minimal, the national share can be as high as 100%. Strong local tax bases can result in local shares as high as 100% of operating losses and as much as half of capital costs. The correct balance for Russia needs discussion among the various levels of government.

By contrast, as Table 4.10 shows, long haul passenger flows do not easily break down by single regional railways. It is interesting, though, that the Western part of Russia (Kaliningrad, October, Moscow, Southeastern, North Caucasus, Volga, Kuibyshev, Gorky and Northern)³⁹ does seem to constitute a relatively distinct set of passenger flows from those of Eastern Russia (Sverdlovsk, South Ural, West Siberian, Krasnoyarsk, East Siberian, trans baikal and Far Eastern). About 61% of all long haul passengers originate and terminate within the Western group of railway, and another 29% originate and terminate within the eastern group of railways – leaving only 10% of the passengers to interchange between the regions. This suggests that Russia might have two long haul passenger companies which could each focus on trips within their region and interchange passengers at their boundaries. Moreover, by giving the Eastern company operating rights into Moscow, another 5% of passengers could be handled without having to change passenger companies.

This grouping would not, of course, introduce competition into the passenger market. Given that the passenger carriers will be totally separated from infrastructure, there is no strong reason why there could not be competitive operating rights, particularly in the large markets like Moscow to St. Petersburg and the international markets to the West. It is also likely that the “losses” of the long haul passenger companies will be strongly related to the infrastructure access fees they are charged in addition to the free or reduced fare burden they bear. Consistent with EU practice, it is reasonable to expect that a combination of carefully designed track access fees for passenger trains based on marginal cost combined with fare deregulation (particularly if the passenger companies are structured to permit competition) and direct compensation for any imposed fare privileges⁴⁰ would yield long haul passenger companies that can operate without major budgetary support and some might possibly be fully commercially viable.

Table 4.10. MPS regional railroad to regional railroad total long haul passenger flows (000 passengers) in 2001

Destinations	Passenger West										Passenger East							Russia
	Russia	Kaliningrad	October	Moscow	South Eastern	North Caucasus	Volga	Kuibyshev	Gorky	Northern	Sverdlovsk	South Ural	West Siberian	Krasnoyarsk	East Siberian	Trans Baikal	Far Eastern	
Origins																		
Russia	108 012	426	14 667	20 682	3 373	8 041	4 075	5 699	6 472	8 299	11 038	3 427	6 733	3 220	3 625	3 473	5 187	108 012
Kaliningrad	341	8	75	248	0	13	0	3	0	0	0	2	0	0	0	0	0	341
October	14 633	79	12 009	520	198	459	118	87	283	734	149	49	24	1	0	0	0	14 633
Moscow	20 692	329	524	6 309	2 025	2 262	941	1 811	2 588	2 214	906	452	329	103	101	49	78	20 692
South Eastern	3 286	0	193	1 995	354	362	164	82	38	13	20	32	22	2	3	2	4	3 286
North Caucasus	8 100	13	457	2 251	395	3 034	577	362	217	163	251	175	157	34	15	2	9	8 100
Volga	4 145	0	138	975	149	554	1 633	272	99	1	166	89	55	9	5	0	0	4 145
Kuibyshev	5 547	2	86	1 782	77	313	239	1 739	216	29	356	577	86	14	13	7	15	5 547
Gorky	6 397	0	280	2 563	47	215	100	222	1 874	237	727	24	69	11	9	4	14	6 397
Northern	8 355	0	749	2 247	23	165	1	34	235	4 823	56	5	10	4	2	1	1	8 355
Sverdlovsk	11 025	0	155	900	34	269	150	366	767	58	7 233	407	573	49	33	14	16	11 025
South Ural	3 499	3	52	481	29	175	81	572	28	6	443	1 290	265	29	23	10	13	3 499
West Siberian	6 855	0	23	349	24	168	53	98	87	11	601	256	4 309	500	215	81	78	6 855
Krasnoyarsk	3 213	0	0	102	3	38	11	16	13	4	54	27	478	2 169	239	33	24	3 213
East Siberian	3 619	0	0	89	4	17	5	14	12	2	38	20	215	239	2 669	222	72	3 619
Trans Baikal	3 502	0	0	47	4	2	0	7	4	2	17	10	76	33	231	2 631	436	3 502
Far Eastern	5 144	0	0	72	8	9	0	16	7	1	22	14	65	21	67	417	4 427	5 144
Russia	108 012	426	14 667	20 682	3 373	8 041	4 075	5 699	6 472	8 299	11 038	3 427	6 733	3 220	3 625	3 473	5 187	108 012

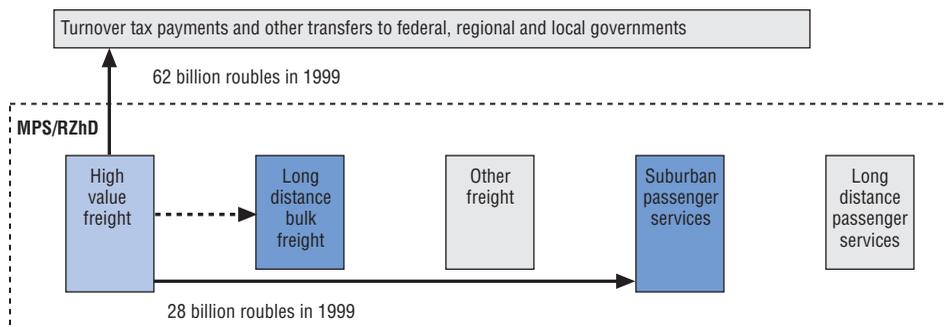
West to West	66 628	Moscow to East	2 018
West to East	5 221	East to Moscow	2 040
East to West	5 453	Gorky to East	858
East to East	31 406	East to Gorky	920
	108 708		5 836

Source: MPS.

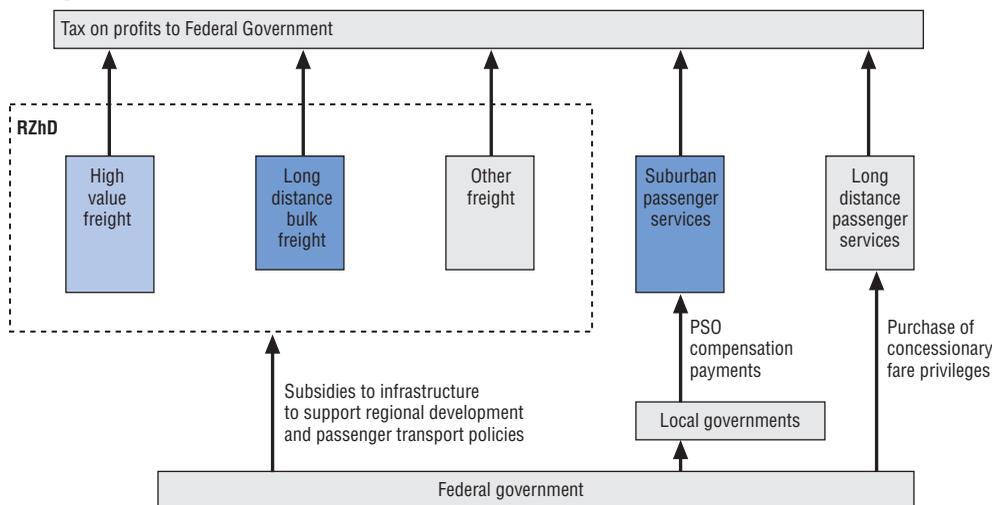
Even with marginal cost access charges for passenger trains, it is probable that a new financing approach will be needed to support passenger services. Suburban services in all EU countries and the US operate at a loss because tariffs are kept low for social and environmental reasons. The current Russian model in which income from freight subsidizes social passenger services will not survive the advent of intra-rail competition and growing competition from road transport: this model is actually prohibited by EU regulation. Figure 4.14 illustrates a different financing model in which passenger infrastructure would receive direct support from the Federal Government (while it owns the infrastructure) and the operating losses of local services are supported by local Governments (who are the primary beneficiaries of the services).

Figure 4.14. **Current financial flows and a model for the future**

Current system



Future arrangements



Notes

1. Reported in *Reference Materials for Rail Transport Structural Reform Programme*, McKinsey Moscow, May 2001.
2. Deloitte and Touche, and Wilson Consultancy, “Methodological and financial grounding for raising financial transparency of operations of railway enterprises”, Moscow, 2002.
3. Federal Law No. 208 of 26 December 1995 on Joint Stock Companies amended on 27 February 2003.
4. The initial Directive 91/440/EEC required only the publication of separate profit and loss accounts. This was found insufficient to make judgments on the existence of cross-subsidies between infrastructure and train operations, or more exactly to prevent public money provide for one activity passing to the other. In a series of amendments to the initial regulations, Directive 2001/12/EC requires both profit and loss accounts and balance sheets to be published.
5. There were 85 initial applications for licences. Some of the other 83 failed to meet the requirements for common carriage but in most cases a licence was not required for the traffic concerned, which was limited to transporting the applicants own freight over private branch lines.
6. The term infrastructure is used to refer to track infrastructure, marshalling yards, terminals, maintenance depots and equipment and sidings – all fixed assets required to provide railway services and which would be uneconomic for the competing carriers to provide themselves.
7. This was the case in Germany where regulatory authorities have experienced considerable difficulty in ensuring new operators have fair access to infrastructure and other assets such as rolling stock.
8. A far smaller railway, on which there is complete separation of ownership, reducing the need for intervention by the authorities to promote competition.
9. The Rail Regulator regulates access and Network Rail’s stewardship of the network, grants licences and investigates complaints under competition law.
10. The Health and Safety Executive covers health, as well as safety, across a range of sectors. In addition there is now a Railways Safety and Standards Board and a Railway Accident Investigations Branch, both independent.
11. S. Guriev, R. Pittman and E. Shevyakhova, *Competition vs. Regulation: A Proposal for Railroad Restructuring in Russia in 2006-2010*, Centre for Economic and Financial Research, Moscow.
12. Truck and barge tariffs are not regulated in the US.
13. Federal Law No. 147 of 1995 on Natural Monopolies.
14. According to Directive 2001/14/EC “the minimum access package to track and service facilities shall be set at the cost that is directly incurred as a result of operating the train service.” In order to obtain full recovery of the costs incurred by the infrastructure manager a member State may, if the market can bear it, levy mark-ups on the basis of efficient, transparent and non-discriminatory principles. This approach enables the infrastructure manager to take into account the long-term costs of specific investment projects when necessary. The determination of the level of charge for the use of infrastructure is generally the responsibility of the infrastructure manager. But where the infrastructure manager, in its legal form, organisation or decision-making functions, is not independent of all train operators, these functions must be performed by a charging body that is independent from all railway undertakings.
15. Those that do not depend on use.
16. See below for details on the variety of charges used to cover fixed costs and see the Annexes for details of national charging systems.
17. This system applies equally to variable and fixed costs, to the limited extent that these costs have been separately identified. The approach therefore does not correspond to the theory of Ramsey-Boiteux price discrimination, which is directed only at the efficient allocation of fixed costs.
18. On which serve representatives from the Ministry of Railways, the Ministry for Economic Development and Trade, the Antimonopoly Ministry, the Ministry of Defence, the Ministry of Transport and the FEC.
19. Entitled Pricelist No. 10-01, Tariffs for Freight Transportation and Infrastructure Services Provided by Russian Railways.
20. Decision 47-T/5.

21. See *Reference Materials for Rail Transport Structural Reform Programme*, McKinsey Moscow, May 2001, fig. 11.
22. Which of these countervailing factors most affects the price of moving coal and ore from Siberia is unclear.
23. Discussion by the team with Russian authorities indicated that one of the reasons that tariffs were made largely uniform was a desire to eliminate what was perceived as corruption in the old system in which local rail managers had the authority to introduce tariff discounts that may or may not have reflected real competitive conditions. While tariff uniformity may reduce abuses, it also reduces the legitimate ability of rail managers to respond to competition. Since the new structure of Russian Railways should act to eliminate corrupt local decisions, the need for totally uniform local tariffs will be reduced.
24. A third aspect of the theory is the assumption that the tax source for collecting the public funds used to pay the fixed costs of the infrastructure is efficient (that is, the tax system itself has the least possible distortionary impact on the economy). A perfectly constructed and efficiently administered progressive income tax system might meet this test, but a poorly managed sales tax system, or even an income tax system in which there is a lot of “leakage” would not. With inefficient taxing, it is not at all clear that the pure marginal cost approach is necessarily any more efficient for the overall economy than approach two above. In fact, when the general taxation system is not optimal, it is quite possible that the economy would be better off making the users pay the full costs of infrastructure directly rather than asking the general taxpayer to pay.
25. The ratio for the freight user was closer to 70 fixed/30 variable. Subsequently, the Government has adjusted the access charges to put more emphasis on the variable component and less on the fixed component. The new access charging system also includes a capacity component in addition to the fixed components and the marginal cost component.
26. The European Community recognizes that access charges may go above marginal cost when the market can bear such charges, when there are specific investment projects to be started, or when there is a shortage of capacity. In the latter case, there must be a plan for increasing capacity and there must be clear rules of priority of access during periods of shortage of capacity. See Directive 2001/14/EC.
27. Russian tariff commodity classes may go some way towards pricing carriage according to ability to pay, but a much higher degree of differentiation than the 3 commodity classes and the subdivision of these classes provided for in tariff list 10-01 would be required to achieve something approaching Ramsey pricing. Moreover the differentiation of charges would have to be based on marginal costs, which have not so far been assessed in Russia. The relation of tariffs to efficiency is further undermined by the distance taper for Class I commodities, which is based neither on costs nor ability to pay, but on political concerns.
28. Publicly held corporations in the US are required by the Securities and Exchange Commission to publish an annual report and in addition an annual 10-K report and quarterly 10-Q reports. Unlike the standard annual reports, the 10-K and 10-Q reports have a strictly defined standard format that ensures transparent reporting of financial performance. They are public and posted on the Commission’s website.
29. It is true that DB Netz also offered small entrants the option to pay a higher average access fee with no fixed component but the Federal Cartel Office still found this fee structure discriminatory and instructed DB Netz to abandon it.
30. Government policies subsidising highways and barges, and regulatory decisions forcing the freight railroads to cross-subsidize rail passenger services, also played a major role in the near-demise of the North American freight railroads. The US experience shows that bad Government promotional and regulatory policies can do a great deal of damage to the transport sector and, in the US case, to the railroads in particular.
31. Intercity railroads – freight and passenger – have mostly been privately owned in the US. In Canada, the Canadian Pacific has always been private, but the Canadian National was publicly owned until 1996 when it was privatized.
32. When Amtrak was created in 1971, intercity rail passenger amounted to less than 1% of public passenger-km, but was absorbing over 25% of the total net income from freight operations of the freight railroads, leaving them with inadequate resources for their own financial needs. This is an experience with direct relevance to Russia.
33. The 180% ceiling is an arbitrary figure set by Congress on the basis of data showing an average ratio of freight revenues to variable costs for the rail industry as a whole of 140%.

34. In Canada, tariffs are negotiated between railway and shipper, and the regulatory authority can only intervene by choosing between the best and final offers of parties in dispute. In addition, shippers located on a line of one vertically integrated railway company but within 30 km of another have an automatic right for access to be provided to the second company's line at a regulated rate. This competitive access provision has rarely been used in practice.
35. The reasons for reducing fares can be to ensure transport for students, for war veterans, pregnant women, the poor, reduction of road congestion or air pollution, or many others. In all of the cases, the market will not naturally set tariffs at a level that would permit the social objective to be reached.
36. The Commission uses this term for two things: *a)* an exclusive right (*e.g.* a concession) awarded by a competition authority; *b)* strict quality standards and/or service provision standards laid down as a condition for entry to a market.
37. By one measure, the operating profit for 2001 was about 51 billion roubles – see Russian Institute for Railway management, *The Railway System of the Russian Federation in 2001*, Moscow, 2002, p. 27.
38. Source of data in this paragraph: Deloitte and Touche study and briefing charts.
39. This Western grouping is slightly smaller than the Western grouping for the freight flows because the passenger flows are somewhat more concentrated in the West of Russia than are freight flows.
40. A typical and effective way of accomplishing this is for the railway company to sell full fare tickets to government and then government can sell the tickets to privileged groups at whatever fare is considered appropriate for the group.

Chapter 5

Railway reforms and investment

As noted throughout this report, one of the primary objectives for Russian Railway reform has been to address the serious problem of the deteriorating condition of the system by attracting large and sustainable volumes of private investment. Even this early on, the reforms have shown some success in this regard. To consider their likely impact on investments over the longer term, it is useful to divide potential private investment projects into four separate categories, and to consider the likely effects of the reforms on the incentives to invest in each. The four categories suggested are a) rolling stock for haulage by RZhD or independent train operators, b) private, geographically limited infrastructure serving a single large shipper, c) locomotives and other assets necessary to enter the market as an independent train operator, and d) possibly in the future, vertically integrated infrastructure and train operation.

Private investors in **rolling stock** are already very much in evidence. They enjoy a “seller’s market”: there is a shortage of rolling stock generally, and acute shortages for particular types, and what rolling stock is available is often in poor, antiquated condition. This means that shippers, independent train operators, and RZhD are all interested in leasing the rolling stock that private investors may make available. The tariff system provides further incentives for the use of private rolling stock because the built-in charges for car usage assume a time frame for car returns that is the average for RZhD: shippers and independent train operators – and their agents, for example “freight forwarders” – can earn profits by allocating rolling stock more efficiently than RZhD has been able to, for example through more efficient empty car movements or a lower proportion of empty backhauls. The dramatic increases in private investment in rolling stock constitute an early success of the reforms.

A second potential area for private investment is in the geographically delimited “**industrial railways**” that serve particular production complexes. 100 to 120 of these vertically integrated industrial railways were separated from MPS between 1992 and 1995, comprising about 8 000 km of track – almost one-tenth of the system at that time. These industrial railways serve two primary functions: they shunt materials among mining, processing, and manufacturing facilities in a given production complex, and they carry outputs from the production complex to the main RZhD lines, where they hand over the outputs for haulage on RZhD trains.

Recently a few new industrial railways have been built and have begun operation, most notably a 158 km line built to SUAL to serve its bauxite mine in the Komi Republic. The owners and operators of these industrial railways – usually the same enterprises that own the large production facilities served by them – are one set of logical candidates to enter into the business of independent train operation over the RZhD infrastructure in the future. Thus to the degree that the reforms provide incentives for independent railway operators, they provide additional incentives for industrial railway operators as well. As this report has argued, these incentives may not be as great under the new reforms as they could be.

The third area for potential private investments is entering the railway market as **independent train operating companies** that would compete with RZhD trains for the business of hauling commodities over the RZhD track. Such independent train operating companies could be either subsidiaries or other affiliates of large shippers like oil, steel, timber, or coal companies, or they could be unaffiliated carriers or logistics companies. Independent operating companies that begin as specialists in one commodity for one shipper face no legal or regulatory obstacles to expanding into more general freight haulage. During the writing of this report the number of such independent train operating companies in Russia rose from two to three, all carrying exclusively oil, with several other companies applying for approval to enter. Even though these numbers are small, the appearance of actual entry so early in the process of restructuring is an unambiguously good sign. The creation and encouragement of this kind of “on-track competition” was one of the overall goals of the reform plan.

It should be emphasized, however, that none of these independent operating companies has yet moved beyond its primary commodity and client. This may be solely because the reforms are in such an early stage. It may also, however, reflect the large share of access charges in total rail transport costs described above. Large shippers may be able to compete when carrying their own cargoes – that is, through forward vertical integration – but not when seeking to serve other shippers. It may also be because of the standard weakness of the “vertical access” model in any setting, and perhaps especially a transition economy setting: potential independent train operators fear that regulators will not be able to insure that they receive equal, non-discriminatory access terms from their vertically integrated rival RZhD, and so they do not make the decision to invest and enter the market. For example, Decree No. 703 *Rules on providing services for the use of general railway infrastructure* applies “in the case of spare infrastructure capacities”, i.e. “when the infrastructure capacity is not limited”. This raises the question, Who decides when there is “spare” infrastructure capacity? The answer to the corresponding question in the Russian gas sector is GAZPROM, and GAZPROM alone. In the rail sector it will be RZhD. There are also the difficult questions of ensuring “non-discriminatory access”, “uniform criteria for access” and “open information”. Experience in OECD countries suggests that resolving these issues requires regular review and detailed oversight by a specific rail regulator if competition against an integrated infrastructure manager and train operator is to develop effectively.

On this and all other issues regarding equal access to the infrastructure, independent train operators rely on the Ministry of Antimonopoly Policy and the Federal Energy Commission (or a future federal railways regulator) to enforce their rights when these rights conflict with the interests of the vertically integrated incumbent. Whether these bodies will be able to effectively detect discrimination, prevent discrimination, and punish discrimination is a critically important question.

The last of the four categories of potential areas of private investment, is for now only a possibility, not a reality. The Government’s policy documents describing the three-stage railway reform process refer to the possibility of establishing “**competing vertically integrated railway companies**” in the 2006-2010 period. We have referred earlier in this report to two broad possible plans for creating and encouraging this form of competitive investment. Some MPS officials suggested that a system of competing vertically integrated railway companies is not possible in Russia because the Russian Railway infrastructure can not legally be removed from state ownership, but this need not be an obstacle. Latin

American countries using this reform model have implemented long-term concessions for the infrastructure rather than outright privatization, leaving ownership with the State, with no noticeable loss of investment incentives to the concessionaires. Overall in world experience to date, competing vertically integrated railway systems have been much more successful at attracting private investment than systems based on vertical separation or open access.

As a long-term reform goal, the division of the Russian Railway infrastructure – or at least the portion west of the Urals Mountains – into several vertically integrated companies, striving for business using both parallel and geographic competition, should be given serious consideration. The major advantage of this strategy is that it would maintain the economies and efficiencies of complete vertical integration between train operations and track operations while still providing for significant rail-to-rail competition. This model of reform has shown itself very successful so far in North and South America in both attracting private investment and recovering the fixed costs of the system. Although at this early stage it is not certain whether the Russian reforms will ultimately encourage or even permit this form of private investment, preparatory work for the development of this approach – including the modeling of railway reorganisation to create competition in this way – should begin in the Ministries responsible for railway reform.

ANNEX A

*Note on non-discriminatory access to railroad
infrastructure*

by

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Abstract

The setting of user prices for enterprises with large fixed costs and marginal costs below average costs – “natural monopolies” – raises important policy questions regarding both efficiency and equity. It has become well accepted among economists that, in a variety of settings, welfare may be improved if such prices are set using systems that are non-linear or discriminatory – for example, two-part tariffs and Ramsey pricing. If these pricing schemes are ruled out, the principal alternatives are large government subsidies or the inefficiencies of fully allocated cost pricing. These are the choices for end use tariffs; why should the setting of access prices be any different?

“For freight, the objective is to apply the rules to ensure that open access means precisely that. The application of competition rules in the rail transport sector as a whole is aimed at contributing to the effective opening of the markets by ensuring that rights conferred upon newcomers are actually exploited in a non-discriminatory way. ... For the market to work properly there must be supply side competition in the form of new entrants capable of mounting a realistic competitive threat; and conditions of access to networks that are transparent and non-discriminatory.” (EU Competition Commissioner Mario Monti, 2002.)

1. Vertical separation and non-discriminatory access

In the ongoing worldwide debate regarding railway sector restructuring, perhaps the only words that are used more frequently than “vertical separation” are “non-discriminatory access”. The former words refer, of course, to the common proposal for some form of “unbundling” of the ownership and operation of the railway infrastructure – track, roadbed, signaling, stations – from the ownership and operation of the trains running on that infrastructure. Whether such unbundling should be of an accounting nature only or should be the creation of wholly separate enterprises, and whether, if wholly separate enterprises are created, the owner and operator of the infrastructure may own and operate trains as well, is a matter of lively debate. The direction of the debate would seem to be in the direction of complete separation without cross-ownership – in the same speech cited above, EU Competition Commissioner Monti argues that “the only way I can see of removing those risks [of market foreclosure and abuse of dominance] entirely when it comes to the allocation of capacity is the complete and irreversible structural separation of infrastructure from operations” – but, as I have argued elsewhere (Pittman 2001a, 2001b), the expectations that vertical separation in the rail sector will create significant competition and significantly increase economic welfare may be overly optimistic.

Whether or not there is complete separation, however, reformers everywhere clearly favor the policy summarized by the second set of words, “non-discriminatory access”. That is, whether the enterprise owning and operating the infrastructure is permitted to own and operate trains or not, it is a matter of certainty for most reformers and reform plans that a restructured railway sector must, as one part of its restructuring, allow all train operating

companies access to the infrastructure on the same terms: there is to be no discrimination, not only between a vertically integrated and a non-integrated train operator, but also among different non-integrated train operators.

As the forceful statement of Commissioner Monti makes clear, this is considered a matter of competition policy as well as regulatory policy – and the Commissioner promises vigorous enforcement action from the competition authorities to enforce this policy. To cite an example to which we will return, the German competition authority, the Bundeskartellamt, recently forced the German railway, Deutsche Bahn, to abandon an access pricing plan “menu” that would have allowed train operating companies to choose between paying a two-part tariff – a fixed fee accompanied by a variable fee based upon usage – and a single, higher, variable tariff, on the grounds that such a plan discriminated against smaller scale users of the infrastructure (Haase, 2001). More generally, Directive 2001/14/EC imposes the following requirement:

“The charging and capacity allocation schemes should permit equal and non-discriminatory access for all undertakings... Infrastructure managers shall ensure that the application of the charging scheme results in equivalent and non-discriminatory charges for different railway undertakings that perform services of equivalent nature in a similar part of the market...” (Preamble point 11, Article 4.5)

Why there should be such a consensus on the desirability of non-discriminatory access to the rail infrastructure is not completely clear. As a matter of competition policy, rules against discrimination among different buyers or sellers may have a sound pedigree, dating at least to the Robinson-Patman Act of 1936 (which amended the Clayton Act) in the United States and to both Articles 85 and 86 of the Treaty of Rome, the Articles which form the basic competition law of the European Union. However, decades of enforcement experience have made it clear that attempting to prevent discrimination may impose tremendous costs on economic efficiency and welfare, particularly as innovation and technological improvements may be discouraged and delayed.² As a result, these rules are widely criticized – one textbook describes the Robinson-Patman Act as “often considered antithetical to the fundamental purpose of antitrust” (Kaserman and Mayo [1995]) – and they are far from a central component of most antitrust enforcement regimes.

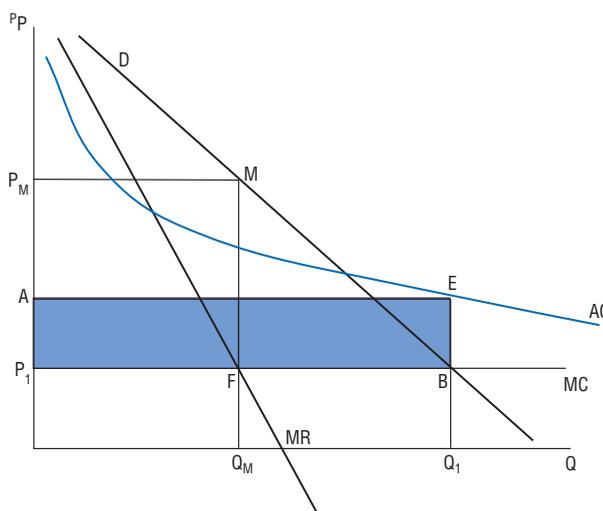
Similarly, there is a long history of complaints of discriminatory behavior as one source of pressure for the creation of regulatory agencies and one rationale for the shape taken by early regulations, but in recent decades there has been a growing appreciation of particular forms of discrimination, both second-degree and third-degree, as policy options that enable regulators to increase welfare as compared with some non-discriminatory alternatives. In particular, economists since at least Joan Robinson (1933) have understood that as a matter of price theory, the welfare implications of price discrimination are ambiguous.

Let us briefly review the discussions regarding the regulation of end-user pricing and then examine what lessons may be available for the regulation of access pricing. I will focus on freight railways only. This is partly because for transition countries like Russia and many other Central and Eastern European countries, the freight share of the rail business is considerably higher than in countries like the UK, where so much of the literature on rail reform has focused, and partly because, unlike rail passenger transport, rail freight transport is generally expected to pay its own way, so that the question of access pricing is less easily obscured by the presence of government subsidies to operations.

2. End-user pricing

Consider a traditional, vertically integrated, natural monopoly enterprise – for example, a railway in a sparsely populated region – with marginal cost curve MC constant over the relevant range of demand and below the falling average cost curve AC . Setting price equal to marginal cost – what was in the past often called the “first best” solution, because it eliminated final-product pricing distortions – results in an operating deficit (in Figure A.1) of the rectangle $AEBP_1$, so that government subsidies are required to pay the fixed portion of costs.³ As the reduction or elimination of government subsidies has been one rationale for reform in the rail sectors of many countries,⁴ setting prices equal to marginal cost has not been considered a desirable solution in most cases (though, broadly speaking, it has been the solution adopted in many countries).

Figure A.1. **Marginal cost pricing**

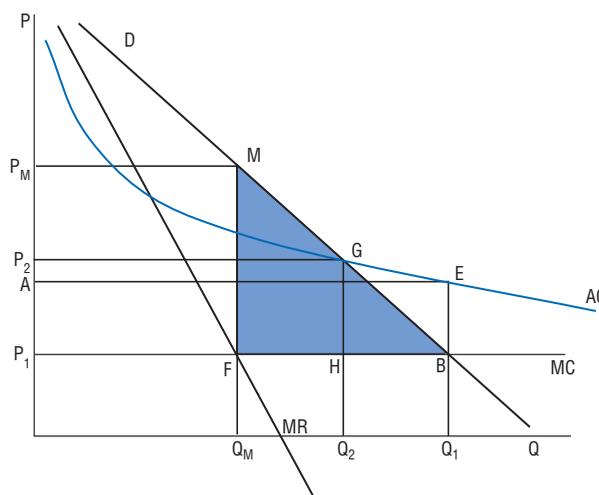


Furthermore, the very label “first best” (besides defying grammar) is clearly a misnomer – or at least overly hasty – unless the subsidies are raised in a completely non-distortionary way. More generally, this solution prevents pricing distortions at the expense of the distortions of taxation: the shadow price on the government revenues $AEBP_1$. Estimates of this shadow price are typically in the range of 15 to 50 per cent in countries with well developed systems of public finance, and much higher – sometimes over 100% – in countries, like Russia, lacking such systems.⁵

What are the alternatives? Note first that the solution against which regulation was created to guard was the unconstrained monopoly solution: quantity determined not by the intersection of the demand curve D with MC but by the intersection of the marginal revenue curve MR with MC (also Figure A.1), price at the (high) level corresponding to that (low) quantity level on the demand curve, a deadweight welfare loss from pricing distortions of the triangle MBF .

The traditional regulatory outcome prevents monopoly profits by setting price at average cost, or more specifically by setting price at marginal cost plus a mark-up sufficient to cover fixed costs, a combination that is also termed “fully allocated cost”: price is determined by where the demand curve crosses AC , with output set correspondingly (Figure A.2). The smaller deadweight loss triangle GBH that results from non-marginal-cost

Figure A.2. Fully allocated cost pricing



pricing is superior to the monopoly deadweight loss MBF and is the price to be paid for avoiding the difficulties and distortions of government subsidies. (As one of many simplifying assumptions so far, we do not consider the effect of government subsidies on enterprise incentives to operate efficiently, both technically and dynamically, i.e. to keep MC and AC low – an effect that empirical research suggests may be of considerable magnitude.)

Eventually economists came to understand that some of these distortions and deadweight losses could be reduced, though not necessarily eliminated, if some form of non-linear and/or non-uniform pricing were allowed. One solution not so different from the “first best” in concept is the “two-part tariff”: customers are charged one fixed tariff for access to the market and a second, variable tariff per unit of output, a form of second-degree price discrimination. As with the “first best” solution, if the fixed tariff can be set in such a way that it is non-distortionary and still cover the fixed costs of the monopoly enterprise, the variable tariff can be set at marginal cost in order to remove the pricing distortion. Also as with the “first best” solution, however, avoiding distortions is easier said than done; if the fixed tariff causes some potential customers not to participate in the market at all, even though their marginal valuation of a unit of output exceeds the marginal cost of production, then the pricing distortion is re-introduced in a different form. One solution is to offer a “menu” of different two-part tariff packages, with those users who are not discouraged by a high fixed tariff paying that in order to enjoy a lower variable tariff.

A second solution may be broadly termed “Ramsey pricing” (Laffont and Tirole, 2000). The original insight came from Ramsey (1927) and was applied to the natural monopoly pricing situation first by Boiteux (1956) and then by Baumol and Bradford (1970). The idea here is that, just as an unconstrained monopolist may increase its profits by discriminating among customers with different elasticities of demand – a variation on the Lerner (1934) rule – so can consumer surplus be increased with a third-degree price discrimination scheme as compared with uniform pricing. Ramsey prices are *defined* as those that maximize surplus subject to the break-even constraint for the monopoly enterprise, so

they are by definition not welfare inferior, and potentially welfare superior, to the traditional regulatory, average-cost-pricing solution.

3. Access pricing

Two-part tariffs and Ramsey pricing are by now a widely accepted and important part of the regulator's toolbox. This makes the emphasis on "non-discriminatory access" to the railway infrastructure all the more notable. Consider the case of a vertically separated railway infrastructure enterprise – a hypothetical construct until just a few years ago, but now observable in the UK, Sweden, and Germany, and planned for the near future in a growing number of other countries, including Russia. Even if, as many reformers argue, the downstream freight train operating sector can support competition,⁶ most would concede that under most circumstances the infrastructure sector itself cannot: its proportion of fixed costs to total costs is high enough that there are economies of scale over the relevant range of demand in most situations. The share of fixed costs in total costs in the rail sector is probably considerably higher than that in two other sectors often also discussed as candidates for vertical separation, electricity and telecommunications (compare Hylen [2000] with Newbery [2000]).

This places the vertically separated railway infrastructure enterprise squarely in the situation of the natural monopoly discussed earlier, with the pricing issue simply pushed one level upstream, from user prices (for the outputs of the integrated rail enterprise) to access prices (for the outputs of the infrastructure enterprise). A broadly accepted estimate for the proportion of fixed (i.e. non-traffic sensitive) to total infrastructure costs in the rail sector might be as high as 90%: that is, train operators paying the full value of the variable costs imposed on the infrastructure from their operations will pay no more than 10% of the total costs of the infrastructure (Hylen, 1998; Ekstrom, 2002).⁷ In a world of vertically separated rail infrastructure enterprises, from where or whom is the remaining 90% to come?

The basic economic analysis does not change in the move upstream, and neither does the set of available options.⁸ As in the previous discussion, we have four principal alternatives to unconstrained monopoly pricing: fully allocated (average) cost pricing, two-part tariffs, Ramsey pricing, and the "first best" solution, marginal cost pricing with government subsidies. Let us consider each one in detail. We will use data for Sweden's vertically separated infrastructure operator, Banverket, to give us rough indicators of the resource magnitudes involved in these alternatives; the total route kilometres of Banverket are, for example, just a bit below those of the Romanian railway system (9 978 vs. 11 364 in 1998), as are the volumes of freight carried, measured in tonne-kilometres (14 400 million vs. 15 927 million in 1998). For Russia, multiply the size of the rail system by eight (86 000 km) and the volume of tonne-kilometres carried by *eighty* (1 204 547 million) (Thompson 2001).

According to its most recent annual report, the total costs of Banverket in 2001 were almost 8 million thousand SEK – almost USD 750 million at the exchange rate at the end of 2001. This figure includes "depreciation and write-downs" on the existing capital stock of about 2.5 million thousand SEK, but does not include "investments in tangible assets" of almost 3.9 million thousand SEK, i.e. over USD 350 million.⁹ Since Banverket was set up in 1988, its mandate has been to set trackage fees at the level of only marginal cost (Ekstrom 2002). In 2001 it received in track charges just under 456 million SEK, or just over

USD 43 million. Using financial figures for 2001 and volume figures for 1998 – we are after only orders of magnitude here – we arrive at an average infrastructure cost per thousand tonne-km of about USD 52, and, assuming constant marginal costs, a marginal infrastructure cost per thousand tonne-km of about USD 3. But let us be conservative and move the marginal cost estimate up to 10% of average cost, or USD 5.20.

In order to examine the possible welfare losses from fully allocated cost pricing, we must use an estimate for the elasticity of demand for access to the rail infrastructure. This demand, as derived from the demand for rail freight transport, seems likely to have at least a bit of elasticity in most situations, especially as many goods that travel by rail are competing with substitute goods shipped from other locations, so that price increases may result in lost markets for the goods. This is especially likely to be the case for export goods. On the other hand, in a country like Russia where rail freight transport tends to face little competition from motor transport over the inadequate highway system, the demand for rail, and the derived demand for rail infrastructure, will be correspondingly less elastic.

Econometric estimates of the own price elasticity of demand for rail freight transport, usually derived from US or Canadian data, have varied a good deal, but have perhaps centered around a value of -1.0 .¹⁰ Some estimates have been as low as -0.5 , however, and this is probably a more persuasive working estimate for the situation in many transition economies. Assuming that the elasticity of substitution between rail infrastructure and other inputs into rail transportation is low, a conservative estimate for the derived demand for rail infrastructure would then be this transportation demand elasticity of -0.5 times the share of rail infrastructure in total rail transport costs, which averages around 0.2; the product, a very rough estimate of the derived demand for rail infrastructure in Russia, is -0.1 .¹¹

Using this estimate and a simple constant-elasticity demand function, a fivefold increase in the access price from USD 5.20 to USD 26 would cause rail freight haulage to decline by about 15%, from 14 400 000 thousand tkm in our hypothetical country to about 12 250 000 thousand tkm, while a nine-fold increase to the fully allocated cost of USD 52 would cause tonnage to decline by over 20%, to about 11 400 000 thousand tkm. The implied welfare loss for our hypothetical country from the latter scenario is about $(0.5)(USD\ 46.8)(3\ 000\ 000) = USD\ 70\ 200\ 000$ per year. Again, to obtain a very rough Russian result to compare with that of our hypothetical country, we multiply by eight, and obtain a welfare loss of about USD 560 million per year to accompany the 20% fall in rail tonnage. (This estimate is sensitive to the elasticity of derived demand assumed. If we use -0.2 instead of -0.1 , the welfare loss is almost USD 1 billion per year, and the fall in rail tonnage over one-third.)

Potential losses of traffic and welfare of these magnitudes certainly focus the mind on finding alternative solutions for financing the rail infrastructure. As with the more general discussion above, two obvious candidates are two-part tariffs and Ramsey pricing. Indeed both of these pricing regimes are heavily used in the United States and Canada:

- An integrated rail enterprise that reaches a voluntary agreement to use the track of another integrated rail enterprise will generally pay a two-part tariff: an annual fee to contribute to non-traffic-sensitive capital costs and a variable fee to compensate for traffic-sensitive costs. The same is generally true concerning payments that are part of involuntary trackage-rights agreements imposed by regulators.
- The majority of rail freight moving in Canada and the United States (since the deregulation set in motion by the Staggers Act) travels under contracts whose terms are

both unregulated and secret; it is certain that under such circumstances, price discrimination takes place.

Unfortunately, either of these strategies for recovering the capital costs of the rail infrastructure would seem to run square up against the strictures of the competition authorities (and, more generally, reformers and regulators) against discriminatory terms of access to the infrastructure grid. The example that must have sent chills down the spines of rail infrastructure operators everywhere is the recent conflict between the German railway infrastructure operator, Deutsche Bahn AG, and the German Cartel Office, the Bundeskartellamt.

In May 1998, Deutsche Bahn introduced “TPS 98”, a set of two payment options for train operators desiring to use the track infrastructure. The first option was a two-part tariff: “a flat-rate charge regardless of the extent of the line capacity used ... plus a variable train path price based on actual usage of the infrastructure” (Haase, 2001). The idea, of course, was to charge a fixed tariff that would contribute to fixed expenses, while keeping the variable part of the tariff as low as possible as “a powerful incentive to increase rail traffic” (*Ibid.*). But Deutsche Bahn wanted to go further and insure that the fixed portion of the tariff did not exclude smaller carriers from using the track. Therefore it also instituted the second option, a purely traffic-sensitive tariff, with this tariff higher than the variable portion of the two-part tariff of option one (otherwise, of course, no one would choose the first option).

Some train operating companies complained to the Bundeskartellamt that TPS 98 was a discriminatory system, both because small carriers would pay a higher variable charge than larger carriers, and because, even under the first option alone, the average price paid by different train operators would differ *ex post* depending on their usage levels – a textbook example of second-degree price discrimination. The Bundeskartellamt apparently agreed, and brought pressure to bear on Deutsche Bahn to institute non-discriminatory access rates. Following “exhaustive talks and consultations” (*Ibid.*), Deutsche Bahn agreed to replace TPS 98 with a single option: a single-level tariff based entirely on usage rates.

It is important to be very careful about terms here. In the context of competition law enforcement in the European Union, concern about discrimination has always been partly about abuse of a dominant supply position in general and partly about actions which may harm the integration of the Union – for example, prices that discriminate in favor of national customers and against customers elsewhere in the Union. This latter aspect of discrimination is certainly as important in the rail sector as in others; infrastructure access prices and other terms that favor the national rail carrier against those from other countries are both easy to imagine and likely to be especially harmful to integration, because of their potentially broad impact on trans-border movements of goods. To the degree that it is this “national” discrimination that is the focus of policies against discriminatory access to rail infrastructure, and other forms of discrimination that are solely elasticity related are permitted, then a two-part tariff or Ramsey type of policy for access pricing may be permitted that will pay the fixed costs of the infrastructure provider. However, I believe that the words of Commissioner Monti quoted above, the actions of the Bundeskartellamt, and the language of Directive 2001/14/EC all suggest strongly that other forms of discrimination are likely to come under attack from competition authorities as well.

Similarly, it is easy to imagine an infrastructure enterprise provided with sufficient pricing discretion to charge different access fees in different geographic areas of the

infrastructure, and to set these fees using knowledge of the elasticity of demand for rail haulage for the commodities produced in those different areas. This would constitute geographic discrimination, but as it would not discriminate among different train enterprises operating in the same area it seems at least possible that it could pass the muster of the competition authorities. In the experience to date, however, no infrastructure operator has been given anything approaching this level of discretion in setting access prices. Also, even this type of discrimination would be difficult to impose in more densely populated regions (such as European Russia) with multiple classes of shippers.

If, then, this action by the Bundeskartellamt is consistent with the opinions and analyses of other competition authorities around the world – and the near-unanimous calls for “non-discriminatory access” to the rail infrastructure suggest that it probably does – then rail reformers are placing their infrastructure enterprises in a difficult position. If a two-part tariff – second-degree price discrimination – is so discriminatory among different users as to be unacceptable from a competition law or competition policy standpoint, then certainly Ramsey pricing – third-degree price discrimination – is as well. But that removes from the list of policy options for paying for the railroad infrastructure the two regulatory tools that are by general consensus the most effective at minimizing welfare losses from price distortions. We have just seen that the welfare cost of fully allocated cost pricing is high, reflecting in part the likely reductions in rail freight traffic from access price increases of such magnitude. Indeed, one of the international criticisms leveled at rail reform in the UK has been that the requirement for the infrastructure enterprise, Railtrack, to cover its costs from access fees has resulted in the setting of those fees at undesirably high levels (Hysten, 2001).

We are apparently left with only a single alternative to fully allocated cost pricing, and that is the original “first best” solution, marginal cost pricing with the government paying most of the infrastructure expenses: i.e. the 90% of infrastructure expense that is not traffic-sensitive in the short and medium term. In a sense this is not a surprising outcome; many Western European analysts have made quite clear their recommendation for a policy of vertical separation of the rail system combined with government support for the infrastructure. For example:

- “If infrastructure charges are set above SRMC because of the need to meet a cost recovery target, the costs to society of the trains which are priced off the network may be larger than the costs of raising an equivalent amount of revenue through general taxation. Economic theory alone cannot identify the efficient level of cost recovery..., but it strongly suggests that it is likely to be low, and probably not very far above that which results from SRMC pricing.” (Hysten, 1998).
- “Optimal rail user charges would, in most places, make a very insufficient contribution to rail track capital, maintenance and repair costs.” (Jansson, 1998).
- “Infrastructure charging should not be a means to achieve infrastructure cost coverage.” (Ekstrom, 2002).
- “In practice, the freight business cannot sustain paying for infrastructure [...] The long term risks of providing infrastructure HAVE to be borne by someone else, usually government (as they do for highways) – however access charges are formulated.” (UK rail commentator, confidential communication with the author, January 2003.)

In fact, Directive 2001/14/EC calls for access prices to be set at the level of “the cost that is directly incurred as a result of operating the train service” (Preamble point 38), though it concedes that they may under some circumstances need to be set at a higher level to

reduce the required level of government support. Both France and Germany have set their access charges according to marginal cost formulas (Hysten, 2001).

Where this outcome is or may be surprising, I believe, is in the transition and developing countries that have received the advice from Brussels and elsewhere to separate their railroad systems vertically AND to set non-discriminatory access charges to the infrastructure. As I have argued here, there are only two choices for the third horse of this troika: either fully allocated cost pricing, with the associated high access charges, losses in rail traffic, and welfare losses, or large, near-100% government subsidies for infrastructure. How large would the subsidies be? In Sweden, where (as in developing countries) policy makers are trying to make up for years of neglect of the rail infrastructure, in 2001 government appropriations to cover the operating costs of the infrastructure enterprise were about USD 370 million, while government loans and grants “for financing of investment operations” were about USD 320 million. In 2002 the Russian government budgeted USD 3.7 billion for railway sector investments (though these included rolling stock as well as infrastructure). Government subsidies of these magnitudes are what railroad sector reforms tend to want to terminate, not to perpetuate.

There are some factors that may mitigate this problem in particular situations:

- First, peak-load pricing of infrastructure access is not discriminatory in the economic sense of this term; if peak-load pricing is allowed – based on time-of-day or day-of-the-week usage, for example – this will contribute some infrastructure funding beyond that measured by variable usage wear-and-tear. However, most freight traffic is not so time-sensitive that it must pay peak-load prices where and when they are charged.¹²
- Second, Russia’s intensity of usage of its rail system is among the highest in the world. If average cost curves indeed slope downward, the gap between average cost and marginal cost for rail infrastructure in Russia may be, *ceteris paribus*, smaller than in other countries. On the other hand, Russia’s railway infrastructure traverses some of the most difficult terrain and climate conditions of all the world’s railroads, and this likely raises fixed infrastructure costs more than variable infrastructure costs.
- Third, it is generally conceded that passenger traffic on the railroads will require government subsidies in most situations; this may be an alternative source of funding for fixed infrastructure costs. However, Russia is one of the countries where passenger transport is the least intense user of the rail infrastructure relative to freight, and in any case moving the required subsidies from one government pocket to another – or from the pocket of the national government to the pockets of regional and local governments – can hardly alleviate the more general problem.

I have been unable to find any discussion of this issue in official documents or press reports concerning railway restructuring in developing and transition economies. The Russian government has adopted a ten-year railways reform plan that calls for vertical separation of the railway sector, “guaranteed nondiscriminatory access to the federal rail transport’s infrastructure for independent cargo and passenger operators, and rolling-stock owners”, and, by the end of the ten-year reform program, “competition in the freight traffic sphere”.¹³ There is an explicit discussion on the Railway Ministry web site concerning the treatment by the reform plan of the current cross-subsidization of passenger traffic by freight.

The tariff policy in the sphere of passenger traffic will be carried on, taking into consideration people’s effective demand, with gradual reduction of passenger traffic cross

subsidies at the expense of freight traffic. The necessary loss cover subsidies should be provided in federal and local budgets to grant directly to transporters or preferential passengers as a kind of individual support.¹⁴

But no statement as to whether the separate infrastructure enterprise is to be financed by user fees, government subsidies, or some combination thereof. Again, only the vertical separation and the policy of non-discrimination are clear. Perhaps the strongest clue is shown in a multicolor diagram distributed by the Ministry of Railways to describe the ten-year reform plan: in both the second (2003-2005) and third (2006-2010) phases of the plan, arrows show “financial flows” from the “state budget” to a “passenger operations support mechanism”, but no such arrows to “infrastructure services” or to the Russian Railways Company (which is to maintain control over infrastructure services).¹⁵

These are vast sums of money that are apparently being glossed over in the debates over railway restructuring in transition and developing economies. As I have noted elsewhere (Pittman 2001a, 2001b), there are serious reasons to doubt whether vertical separation is the best strategy in many countries, Russia included; I believe that both “source competition” and “parallel competition” among vertically integrated rail companies may be a more promising solution, at least in European Russia. But this problem will suffice for starters. Countries that have reformed their railways in such a way as to maintain vertical integration have, in so doing, implicitly created the possibility for internal discriminatory pricing of access to infrastructure. If those reformers and advisors recommending vertical separation are also insisting upon non-discrimination, they need to say where the money for the infrastructure is coming from. And if it is coming from the state, policy makers who are considering reforms need to be aware of that.

Notes

1. New Economic School, Moscow, and Economic Analysis Group, Antitrust Division, US Department of Justice. I thank Tim Brennan, Sergei Guriev, Marius Schwartz, and Louis Thompson, seminar participants at NES and the Center for Economic and Financial Research (CEFIR), and students in my class at NES on the Economics of Antitrust and Regulation for very helpful comments on an earlier draft, and Zhenya Zhabitskaya for excellent drafting of figures. The views expressed are my own, and do not necessarily reflect the views of any reader or of the Department of Justice. A revised version of this paper, under the title “Russian Railways Reform and the Problem of Non-Discriminatory Access to Infrastructure”, is forthcoming in v. 75, #2 (June 2004) of the *Annals of Public and Cooperative Economics*.
2. See, e.g., Schwartz (1986).
3. My colleagues Grigory Kosenok and Judith Shapiro suggest that the “first best” label is also a nod to the “theory of the second best” of Lipsey and Lancaster (1956). In the context of the current paper, there is no need to consider “second best” policy measures, since the primary competitors to rail transport, long-distance, truckload-haul trucking and water transport, are both generally structured as competitive industries.
4. See, e.g., Estache, Goldstein, and Pittman (2001).
5. See, e.g., Gagnepain and Ivaldi (2002) for the former and Jones, Tandon, and Vogelsang (1990) for the latter.
6. As I note in my two papers cited above (Pittman 2001a and 2001b), this point is not at all obvious. In fact, most measures of economies of density in the rail sector would support the opposite conclusion: that opening up the infrastructure to free entry by train operators would result in one dominant train operator, or at best a small-number oligopoly of train operators.
7. The UK experience is broadly similar, with the current estimate a bit higher. Immediately after reform, variable costs were estimated at 9% of total infrastructure costs: 3% per cent covering direct wear on the infrastructure, 6% covering electricity charges for traction. In 2001 the estimated

- total was increased to 15%, with the cost of direct wear increased to 9%. In addition, beginning in 2001 a congestion charge of 5% was added to the variable portion of infrastructure charges (Preston, 2002).
8. Note, however, that the welfare implications of discriminatory pricing of an intermediate good are not as well understood as for final goods. I am indebted to Tim Brennan and Marius Schwartz for helpful discussions on this point.
 9. Indeed, Jansson (1998) remarks approvingly that “Before the separation of SJ [the train operator] and Banverket, rail track investment had been lagging behind for decades because of SJ’s chronic financial problems. The most important effect by far of the separation in 1988 has been a surge in rail track investment that no one could have dreamt of before. It should be emphasized, however, that this investment has not been financed by the rail transport sector but by the taxpayer.”
 10. See, for example, Friedlaender and Spady (1980, 1981); Oum (1989); Oum *et al.* (1990); and Hsing (1994). An extremely useful summary of this and related literature has been compiled as the “Elasticities Database” by the Australian Bureau of Transport Economics, and is available at <http://dynamic.dotrs.gov.au/bte/teadb/index.cfm>.
 11. The formula for the elasticity of derived demand is shown by Kennan (1998), explicating the discussion in Hicks (1935).
 12. See Newbery (1998): “A distinction can be made between systems where there is a very inelastic demand in the short run, where you have to either meet that demand or the system collapses, and systems like the Internet where there can be long delays in the supply of information and where the demand is elastic. Railways are rather like the latter. Where there are systems that are intolerant of the absence of capacity then the obvious solution is to load all of the charges onto the provision of capacity... This is seen in abundance in the [UK] electricity industry with a very peaky pricing system.”
 13. Ministry of Railway Transport of the Russian Federation, “The Railway Transport Reform for Industry, Country and People,” Analytic Material 27 June 2002, www.eng.mps.ru/agency/showarticle.html?article_id=37&he_id=71.
 14. *Ibid.* See also Ministry of Railway Transport of the Russian Federation, “Goals and Stages of the Structural Reform in the Russian Rail Transport in 2000-2010,” Analytic Material 17 February 2002, www.eng.mps.ru/agency/showarticle.html?article_id=10&he_id=71.
 15. Ministry of Railway Transport of the Russian Federation, “Railway Sector Restructuring Priorities”, Moscow, November 2002.

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ANNEX B

Lessons from the privatisation of Britain's railways¹

by

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1. Introduction

1.1. Purpose of this paper

The aim of this paper is to draw lessons from the experiences of the reform of Britain's railways that may be relevant to Russia.² The paper describes the key features of rail privatisation in Britain, its impact, issues associated with the financing and organisation of passenger operations, track access charges and infrastructure management and planning. Whilst there are notable differences between the British and Russian Railway systems, not least in the small size and the importance of freight transport in Britain, there are important lessons to be learnt.

1.2. Historical context

Railway reform in Britain began during the 1970s and 1980s. Non-core businesses, such as train manufacturing, were privatised and the core business was structured into business sectors³ within British Rail, which remained a public sector corporation. Business sectors progressively increased their control over the various railway functions: in the early 1990s, this process reached its logical conclusion when line of route businesses took over infrastructure, with the main user of each section of infrastructure "owning" and managing it. This vertically integrated model was never given time to be fully tested.

Rail privatisation took place towards the end of a long period of Conservative administration. The "privatisation" concept had been a defining feature of the Thatcher era and the privatisation of the network utilities⁴ had been notable political successes. By the early 1990s, the railways and the Post Office⁵ were the only two large network industries that remained in the public sector. British Rail had a poor reputation with the public and it had a history of militant trade unionism.

At the same time, there was a strong political awareness that the railways could not be allowed to fail. A third of the network had been closed following the 1963 Beeching Report and the controversy provoked by this process was still in the political consciousness. As a result, while there had been very little political will to invest in a substantive revitalisation of the railways during the intervening period, successive governments had ensured that passenger services were preserved more or less as they had been in the early 1970s. The closure of local rail services was seen as politically unacceptable, particularly as individual politicians' fortunes are locally determined in the British parliamentary constituency system. This cautious attitude towards passenger services strongly affected the way in which the privatised rail system was to be regulated.

As a result of continued subsidies, passenger demand had increased in the decades prior to privatisation (although rail's market share declined). In contrast, rail freight traffic had declined dramatically, in both absolute terms and in terms of market share, as road haulage became more competitive and the rail's traditional bulk markets shrank. Rail freight was far less regulated and received fewer subsidies than rail passenger services but

had to exist in a system in which the perceived needs of passengers dominated allocation decisions.

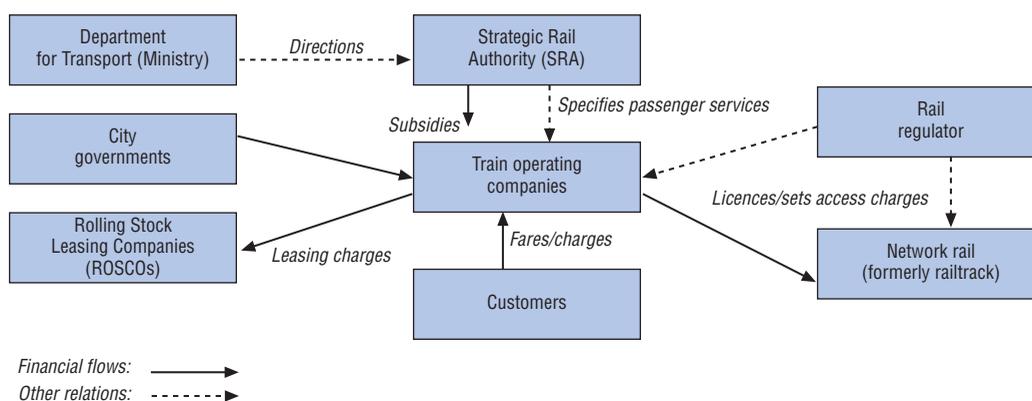
1.3. Key features of privatisation

Rail privatisation in Britain was probably more radical than in any other industrialised country before or since. It is generally referred to as “privatisation”, although this word fails to adequately convey the nature of the changes which occurred. In fact, although there is the widespread involvement of private interests, Britain’s rail system remained substantially under public control after privatisation and the degree of control has since increased with the formation of the Strategic Rail Authority (SRA) and the change in status of the infrastructure manager.⁶ In particular, the reform was accompanied by the imposition of a relatively heavy regulatory burden which, *inter alia*, prevented rapid change in the provision of passenger rail services.

The economic rationale for the reforms was provided by a 1992 White Paper entitled “*New Opportunities for the Railway*” in which the stated objectives of government were “to see better use made of the railways, greater responsiveness to the customer, a higher quality of service and better value for money (i.e. reduced government support.)” Safety standards had to be maintained. The Railways Act 1993 contained the necessary statutory provisions.

Privatisation involved the dismantling of the vertically integrated national railway operator (British Rail) and the creation of about 80 separate organisations linked to each other in a regulatory and contractual matrix. Some organisations (Railtrack and passenger franchises) were regulated, others (freight and rolling stock companies) were competing ones. The main elements of this structure are illustrated in Figure B.1 below:

Figure B.1. **Structure and relations within privatised rail industry in Britain**



Managerial relationships within British Rail were therefore replaced by regulatory and contractual ones. The essential feature was the separation of infrastructure and operations, whereby a private company, Railtrack, became the regulated monopoly supplier of infrastructure services to a series of operators: the 25 passenger franchises were geographically separated and the three (now four) freight operators were focussed initially on different markets, but with one carrying 90% of freight.

Responsibility for regulating these new private sector companies was divided between:

- The Office of Passenger Rail Franchising (OPRAF), whose main responsibility was to set and monitor the conditions relating to the prices and quality of service offered by the passenger Train Operating Companies (TOCs) under franchise agreements – in 2001, OPRAF was replaced by the SRA with much wider duties.
- The Rail Regulator, whose main responsibility was to oversee the conditions of access to Railtrack's network, including infrastructure charges.

The rolling stock leasing companies (ROSCOs) are essentially providing a banking service to operators, mainly so passenger operators have lower capital requirements. The ROSCOs had been formed from British Rail and privatised. They were not regulated on the assumption that competition would ensure adequate conduct and performance.

The franchise agreements included provisions requiring all passenger train operators to participate in “through” and interchangeable⁷ ticketing and in the provision of impartial information, in order to preserve the benefits of a single network with 25 franchises.⁸

2. Impact of reforms

2.1. Growth

There is a widespread public perception, in Britain and internationally, that the reforms have not been successful. However, against most broad indicators, including those of safety, there have been significant gains. One of the most significant gains is that rail has apparently attracted considerable traffic back from roads, and it is partly the negative consequences of that growth which has caused many of the industry's problems.

In the seven years following rail privatisation (1994/5-2001/2), passenger km increased by 36% (but still only represented 6% of the national market) and freight tonne km increased by 50% (but still only 8% of the national market). To accommodate this growth, train km increased by 21%.

The reasons for growth include the following:

- Economic growth was considerable.
- Fare levels generally increased by less than inflation, especially for London commuters, which was a result of regulation.
- Private sector disciplines instilled a marketing drive to grow and sell, provided a greater urgency and a lower tolerance of overheads and bureaucracy.
- There was some improvement in customer service, with more staff on trains, the development of a reliable national rail enquiries service, a better range of fares and marketing offers, and a major station regeneration programme.
- There was substantial investment in new rolling stock for both freight and passengers, assisted by the successful development of a train leasing market.
- New talent was encouraged to enter the industry.

This growth was unexpected and remains the outstanding success of the rail industry following privatisation. However, this success exposed and exacerbated a number of problems inherent in the design of rail privatisation, which was essentially aimed at reducing the costs of the railways to the Government, whilst maintaining the *status quo*, not at facilitating growth. The two main weaknesses exposed were the incentive structure

and the method of allocating capacity on the network. We discuss these in the remainder of this chapter.

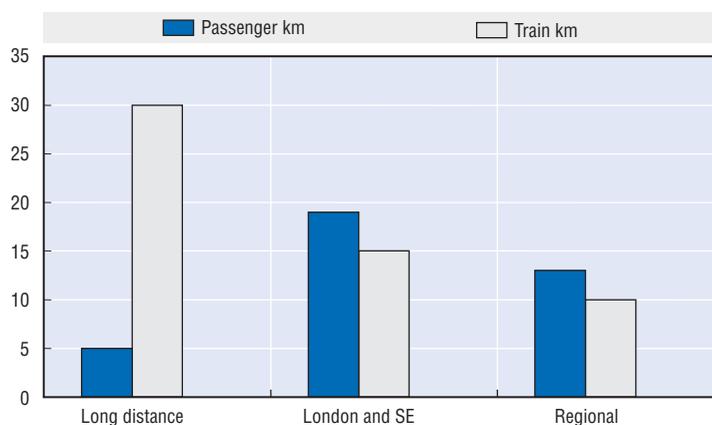
2.2. Incentive structure

The incentive structure established at privatisation did not cater for growth for the following reasons:

- Railtrack had insufficient incentives to invest in infrastructure capacity and, even if it had had the incentives, it could not have afforded to invest adequately, given the rapid growth in demand – this is because it was funded through track access charges which increased only slightly if traffic increased.
- Train operators had commercial incentives to cater for and encourage growth in some markets, but not in others.
- The incentives to Railtrack and train operators were poorly aligned with each other.

Much of the problem of incentives lay in the track access regime which is discussed in Chapter 4. However the track access regime was not the only problem. Incentives to train operators also led to results which are not in the public interest. For example, although there has been growth in the train km, growth has not necessarily occurred where it is most socially beneficial. Figure B.2 shows that train km on Long Distance (Intercity) services have increased by more than passenger km, whereas the reverse is true for London and South East operators and Regional operators.

Figure B.2. **Increase in passenger and train km by type of operator (1997/8-2001/2)**



One reason for the rapid growth in train km for Long Distance operators is that they operate in more competitive markets and there is a commercial incentive to increase capacity in order to improve service quality. Under the original franchise arrangements, operators received no incentive (beyond revenue from ticket sales) to increase the capacity available for passengers, irrespective of the impact this might have, for example, on road congestion. London's large rail commuter network therefore remains overcrowded in peak periods and customer dissatisfaction with service quality is high.

A bonus system could have helped align growth to social benefit, for example by encouraging the growth in peak commuter traffic, where there is a large social benefit in comparison to off peak leisure travel, which has actually grown faster. Under the franchising

regime, TOCs have faced a perverse incentive to discourage additional commuters, because the extra revenue is rarely sufficient to cover the extra costs of rolling stock and train operations. One solution might be for the SRA to make an extra payment related to increases in passenger km for certain types of trip.

Under the revised franchising policy introduced in 2003, services will be highly specified to allow the SRA to direct resources to where they produce the most social benefit. However, this signals the withdrawal of franchise operators from longer term investment decisions and the return of central planning, which has its own disadvantages.

2.3. Shortage of capacity

The rapid growth in train km has caused congestion on the network and has been associated with a major deterioration in train performance (i.e. more delays and cancellations). It has also meant that more maintenance was needed, but the increase in freight trains has meant that there was less time to carry out the maintenance (which is normally carried out at night when most freight trains run). This has raised a number of questions about how capacity should be allocated on the rail network.

The political imperative, at the time of privatisation, of avoiding the closure or reduction of passenger services meant that franchising agreements stipulated a defined set of public service requirements. These defined minimum levels of service in terms of frequency, speed and time of day – through track access agreements, operators were given rights to train paths on the infrastructure for these services.

The passenger franchises use a large part of the infrastructure capacity available, especially at peak times. The allocation of the remaining rights was Railtrack's responsibility, subject to the regulatory control of the Rail Regulator. The Regulator limited the scope for open access passenger operations in order to avoid the "cherry picking" of the most profitable services from the franchised operators which would increase their subsidy requirements.⁹ Although moderating competition in this way was intended to be temporary, more open competition was in practice never introduced. Also, although track access agreements contained provisions for trading of paths at the margin, these provisions were not used.

The result is that the development of markets for services and train paths has not occurred. Railtrack could have charged train operators according to their willingness to pay – certain types of traffic, perhaps inter city services carrying large numbers of high fare paying passengers or certain freight trains, could then have paid more than others, such as short regional passenger trains, and achieved a favourable reallocation of capacity.¹⁰

The services which were actually operated were instead the result of a mixture of regulatory controls (exercised through the franchise agreements) and commercial forces. Conflicts were resolved by the Rail Regulator using a complex set of decision criteria. The result was that timetable changes were difficult to achieve and there was no mechanism to transfer paths from low to high value users. One consequence is that freight train operators have been unable to attract certain time sensitive customers to rail because they cannot acquire the necessary train paths – despite their willingness to pay.

Capacity is allocated through the timetable but the large number of franchises means there are often many different operators using the same section of track, making it difficult to achieve a well integrated timetable. Also Network Rail co-ordinates the timetable planning process and has to balance the aspirations of different operators using decision

criteria defined by the Rail Regulator. These criteria do not reflect the economic values of the different uses of capacity and the SRA is now providing more strategic guidance on priorities to the industry and the Regulator.

As with the changes to franchising policy, this approach relies on economic analysis and administrative decision making, rather than providing an appropriate incentive framework in which commercial decisions can be made by the private sector.

3. The financing and organisation of operators

One of the purposes of the original privatisation model was to provide stability in financing for the railways industry. Under public ownership, the railways had suffered from inadequate funding which fluctuated over time in response to government budgetary problems. This made it difficult to plan investment projects and meant that the railway supply industry, principally rolling stock manufacturers, experienced considerable uncertainty about future demand and this led to increased costs.

By channelling nearly all government funding through revenue payments to private franchised operators, with which a government agency would have binding contracts, it was anticipated that the government would be required to make long term commitments (for the length of the franchises) to financing the industry. Another objective was to reduce costs by replacing the public sector monolith by private operators selected through a competitive process. In practice, after a brief period during which these objectives were met, events have since turned out differently.

This section describes the original methods for organising and financing operators, sets out how these have evolved to meet weaknesses in the system, and identifies the remaining issues that need to be resolved.

3.1. Organisation of passenger operations

In 1994, in preparation for privatisation, British Rail's passenger operations, which represented about 90% of its revenues, were split into 25 companies, broadly on a line of route basis. Contrary to earlier government plans to introduce on-track competition in the passenger market, there was little overlap between the services provided under different franchises. Also, the scope for open access operators to enter the market was limited by rules defined by the Regulator to moderate competition. The reason for moderating competition was that it was feared that competition would reduce the financial performance of the industry and create too much uncertainty for the private sector, thereby increasing the amount of government support required. Also, there was concern that multiple operators on the same track would create operational problems.

During the period 1995-1997, the 25 companies were franchised out to the private sector under a competitive process for periods of 7-15 years, with longer periods adopted where major investment was needed. The choice was made almost entirely on the basis of minimum subsidy cost to operate services, which were broadly set at pre-privatisation levels. These were known as Public Service Requirements and were essentially minimum requirements (they could be exceeded). Franchise contracts were "net cost", meaning that the private sector took both revenue and cost risk.

Franchises were let with rolling stock leases in place with three private rolling stock companies (ROSCOs). This meant that franchise operators did not need to invest in rolling

stock which would have involved high risks and poor value for money, given the short franchise lengths.

3.2. Funding of franchised passenger operation

Most franchises were won on the basis of negative bids (the franchise operators received financial support rather than paying for the right to operate services). The only operator paying a premium initially was the airport operator, Gatwick Express, although others have moved from support to payment over time. Funding for the franchises is provided by:

- OPRAF which was absorbed into the Strategic Rail Authority (SRA), when the SRA was established in 2001.
- The Passenger Transport Executives which support all public transport in the seven major metropolitan areas outside London.
- Since devolution of political powers to Scotland and Wales, Scottish and Welsh bodies have handled some of the funding of rail.

There was considerable interest in bidding, with the bidding dominated by private bus operators formed ten years earlier by the privatisation of bus operations. Franchises were awarded using the sole criterion of “least subsidy” and, as a result, the franchising process was relatively simple.

However, “least subsidy” does not necessarily provide best value for money and operators had neither the incentives nor the margins to invest and improve service quality.

The seeds of other future problems were also sown at that stage. For example, to win franchises, bidders put in optimistic traffic forecasts which, where they were achieved, often proved to require more network capacity than was available.

3.3. Trends in support to passenger franchises

Whereas growth has been high in all markets, it has usually failed to meet the expectations of bidders at the time of franchising. Franchise bidders had also planned to reduce costs, particularly labour costs since most other costs (track access, leasing charges) are predetermined. In practice, costs have increased, mainly because of shortages of skills and consequent pressure on salaries, and also because staff numbers have increased slightly, rather than fallen as expected.¹¹

According to the initial franchise bids the annual loss of the industry, before government support, needed to fall by about £600 million. In practice it fell by only £220 million. The resulting shortfall was either met by lower (and sometimes negative) operating margins or by increased support from the SRA. In the late 1990s, several franchises, especially those providing regional services began to lose money.¹² Rather than terminate the franchise contracts and seek tenders for refranchising, the SRA decided that it would be cheaper to amend the franchise contracts, usually by taking the revenue risk itself. More than one third of franchise contracts have therefore become “gross cost” contracts.¹³ Because these operators then have little incentive to increase revenue, the level of SRA support to these operators has therefore increased substantially.

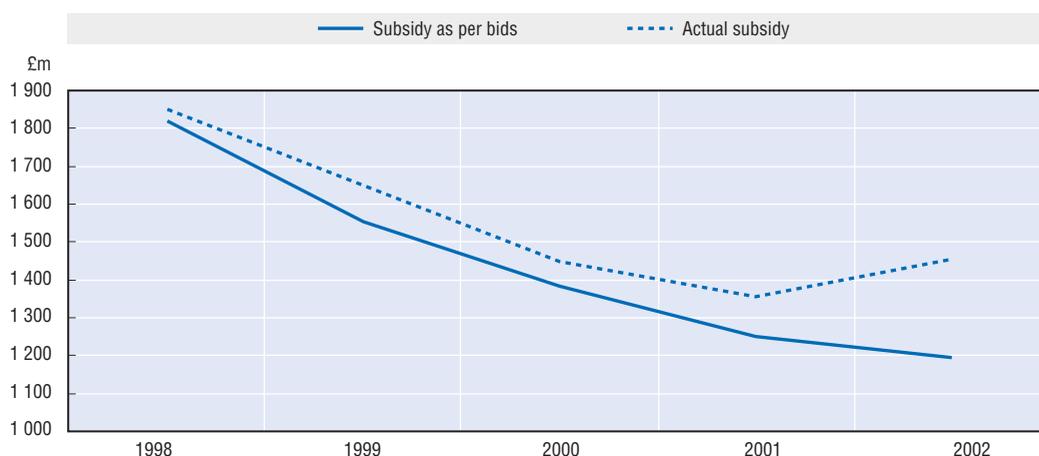
A further factor which affected franchise payments was the introduction of the Rail Passenger Partnership (RPP) scheme in 1999, aimed at encouraging improvements in the local and regional rail network. This scheme can be used to support both capital projects and revenue support.¹⁴ These grants are only awarded for projects that are not

commercially viable but for which there are social benefits. Payments are made by providing additional revenue to franchise operators. By June 2002, 56 schemes with a total support requirement of £69 million have been awarded under this scheme.

Finally, the track access charges payable by operators increased following the second periodic review (see Chapter 4) and the SRA bore the cost of these increases from April 2001, again payable through increased franchise payments.

As a result of these three changes, after several years of decline, which should have continued according to the original bids, the net cost of supporting the industry began to increase in 2002, as illustrated by Figure B.3.¹⁵

Figure B.3. **Annual payments to franchised passenger operators (£ million) 1998-2002¹**



1. Figures include incentive payments/penalties to/from operators for good/bad performance (delays). Poor performance in recent years has meant that net payments to operators have been reduced. Excluding incentive payments, net payments to operators increased in 2001/02.

Source: SRA, KPMG Analysis, Franchising Policy Statement, November 2002, Strategic Rail Authority.

In addition, as discussed in Chapter 4, Railtrack (now Network Rail) was not able to finance infrastructure investment schemes from its own balance sheet and there is no incentive for operators to finance such schemes. As a result, it was decided that the SRA would finance some investment projects through direct payment to Network Rail, and that Network Rail would no longer be expected to rely on track access charges alone to pay for such projects. This may make it more difficult to protect the industry from the effect of government budgetary pressures on funding, since it will be easier for the government to cut projects with Network Rail, than for it to renege on its long term contractual commitments to franchise operators.

3.4. Changes to the franchising process

There have been a number of initiatives to change the franchising process in the last three years with the first change aimed at increasing investment through the use of longer franchises (one was awarded in 2001 for 20 years). This policy has now been reversed and, under the current policy, which was announced in November 2002,¹⁶ franchises will normally be for 5-8 years, instead of 7-15 years in the first round of franchising.

The current policy differs from the policy at privatisation in the following respects:

- a) Instead of simply defining Passenger Service Requirements, the timetable and train formation (number of vehicles) will be specified – this is to ensure that the wider implications of services are considered, particularly the effect on network crowding.
- b) The timetable will be developed through a consultative process with bidders and stakeholders, particularly local authorities, and there will be provisions for changing the timetable that the operator is required to run, and the associated track access rights and charges, during the franchise period.
- c) The complex incentives regime to improve service reliability will be replaced by a system that relies more on direct intervention by the SRA when targets are not met.
- d) Key Performance Indicators on elements of passenger journey quality (cleanliness, station ambience, passenger information, ticket sales and security) will be introduced and subject to internal audit by the operator and checking by the SRA.¹⁷
- e) Operators will manage the cost risk (i.e. they will incur the full burden of any increase in cost, except where this arises from the charges they pay to Network Rail for track access or where Network Rail causes costs through its poor performance). Also, costs will be transparent and benchmarked, making it more difficult for operators to transfer the cost risk to the SRA.
- f) Operators will share revenue risk with the SRA where there are excessive profits or losses.
- g) Operators will be provided incentives to identify and deliver investment opportunities, particularly towards the end of their franchises, when the commercial incentives are weakest.

3.5. Emerging role of regional and local stakeholders

In contrast to many other countries, Britain has been slow to pass full responsibility to regional and local government for the funding of local rail passenger services. Devolution of powers has been limited to the Passenger Transport Executives (PTEs, the bodies responsible for transport in the seven major cities outside London) and, more recently to bodies in Scotland and Wales. Although the PTEs specify services, most of the funding of these services remains with the SRA. This mis-match of responsibilities has been aggravated by the PTEs' focus on the needs of local passenger services which, on congested networks, often prevent freight and intercity services gaining access to the network. As a result, relations between the Central Government/SRA and the PTEs are poor and it is proving difficult to optimise services. A similar problem may arise for London, where the Major has limited funds but has powers to give Directions and Guidance to the SRA.

The SRA is attempting to address this mis-match problem through consultative processes but it is difficult to see how these processes alone can resolve the problem, given the different objectives of the parties.

The eventual solution may be that adopted in other West European countries such as Germany and France where regional and local government bodies have taken over responsibility for funding local rail services (as well as other transport services, in exchange for compensation from central government. However, this may lead to even more congestion on the network, if track access charges do not fully reflect costs, including the opportunity cost of scarce capacity).

3.6. Funding of rail freight

Unlike passenger services, freight services are not operated under franchise agreements but on a competitive, open access basis. However, in common with passenger services, there is now direct funding for freight schemes although, so far, funding for major freight projects has been limited to feasibility planning work. There are also two other types of finance for rail freight:

- Freight Facilities Grants, which support capital projects.
- Track Access Grants, which provide revenue support to help freight operators pay access charges.

As with the Rail Passenger Partnership scheme, Freight Facilities Grants and Track Access Grants are only awarded where schemes are not commercially viable but generate adequate social benefits to justify the scheme. In the Year 2001/02, £33 million in Freight Facilities Grants and £22 million in Track Access Grants were paid out.¹⁸ Total support for freight in that year was therefore less than 5% of revenue support for passenger services.¹⁹

Looking to the future, major infrastructure schemes for rail freight (as for rail passengers) are currently being developed and, if they meet economic tests and if there is money available, they may be financed by the SRA. In 2001, the Government and the SRA envisaged spending £3.4 billion on rail freight over the period 2000-2010 (nearly 10% of the total government support for rail) but, due to shortage of money, the level of support is now unlikely to attain that level.

4. Track access and final user charges

A report for the European Commission in 1998 on access charges²⁰ classified track charging systems in Europe into three types:

- The Marginal Cost approach which bases charges on short run marginal costs. This approach has been adopted in Sweden, Finland, the Netherlands and, to a large extent, in Denmark. Cost recovery is low (typically 15-30%) and infrastructure is therefore funded mainly by Government. This approach prevents discrimination against new entrants and ensures use of rail where it is economic to do so.
- The Adjusted Average Cost approach, which bases charges on average rather than marginal costs. The Adjusted Average Cost Approach has been adopted in Germany, France, Belgium, Italy and Austria. The level of cost recovery is generally higher than with the marginal cost approach, though not necessarily 100%. Variable charges (which vary with volume) are therefore sometimes well above marginal cost, even for price sensitive traffic, and fixed charges (which do not vary with volume) are sometimes also imposed.
- The British approach, where access charges were initially intended to provide for all Railtrack's costs²¹ being recovered through access charges (though this is no longer the case) – there are fixed and variable elements and the variable proportion was intended to reflect marginal costs (though these were underestimated). The British approach is therefore a hybrid of the other two approaches.

In contrast to Russia, track access charges are not derived from tariffs to final users under any of these approaches.

This chapter describes the British approach which, like many other elements of the British model, has evolved significantly since the time of privatisation due to serious

problems that emerged around the year 2000.²² The chapter then goes on to discuss passenger tariffs and freight rates and their relationships to track access charges.

In Britain, the Rail Regulator sets the policy on access charges for rail infrastructure through an open consultative process. The Regulator must balance the interests of Network Rail with those of its customers – the train operating companies. He must ensure that Network Rail's income is sufficient to finance its activities – the maintenance of assets and enhancements. He must also ensure that Network Rail's customers obtain good value for money from Network Rail since, if they are dissatisfied, they cannot go to an alternative infrastructure manager. The Regulator must also ensure that Network Rail is efficient. These are "Statutory Duties" defined under the Railways Act 1993.

The Regulator sets both the level of charges, which determines Network Rail's regulated revenue,²³ and the structure of charges and other regimes, which determine the incentive framework. These are each described below.

4.1. Network rail's revenue requirements

Access charges are set by the Rail Regulator during periodic review processes which take place every five years. Charges are changed annually, based on the retail price index (inflation indicator). This has an advantage over regulation based on a set rate of return in that it encourages efficiency. However, it creates a difficult challenge for the Regulator in getting the price right. In each of the periodic reviews, the Regulator expected Railtrack/Network Rail to achieve efficiency improvements (2% p.a. over 1996-2001 and 3.1% p.a. over 2001-2006). Network Rail's regulated income therefore declines over time unless this is offset by increased traffic.

The Rail Regulator determines Network Rail's required regulated income by calculating the sum of:

- The product of the Regulatory Asset Base (RAB),²⁴ allowing for enhancements and renewals planned for the period, and the pre-tax rate of return that the Rail Regulator considers that Network Rail requires to finance those enhancements.
- The costs of efficiently operating and maintaining the railway to achieve defined outputs.

The RAB is based on the value at which shares in Railtrack was valued after floatation on the stock exchange.²⁵ There was considerable disagreement between the Regulator and Railtrack at the time of the second review, as to the correct basis for estimating the RAB. The main issues were: the level of uplift on the value of shares after floatation, the values of renewal and enhancement expenditure and under-delivery during the first period and the value of enhancements planned for the second review period.

Similarly, there were differences of view over the level of efficiency that it was reasonable to expect from operating and maintaining the railway.

For the first review period following privatisation (1996-2001), access charges had to cover all of Railtrack's costs, including all those for enhancements, since there were no alternative sources of funding. However, it was found that Railtrack was not investing sufficiently (partly because of the lack of incentives for it to develop the network).

For the second review period (2001-2006), it was assumed that one third of Network Rail's funds for enhancements will be financed by the Strategic Rail Authority (the SRA, a government agency)²⁶ and two thirds from access charges.

4.2. The incentive framework

The structure of access charges for the first review period was based on the assumption of a steady state or declining railway, reflecting the previous trends under public ownership. The variable element of charges for passenger operators was small (representing an average of 8% of total charges) There were two reasons for this. First, it was thought that this reflected the actual proportion of Railtrack's costs that were variable. Secondly, it was considered that a higher figure would encourage operators to cut services and discourage them from introducing new ones. However, in practice, the low variable charge had two perverse effects:

- It discouraged reductions in services for which demand was weak and which, if terminated, could have freed capacity for new services.²⁷
- It encouraged operators to expand services which were not necessarily justified by their benefits – the congestion costs of additional services (largely from worsened network performance, *i.e.* delays) were not fully reflected in variable charges, since capacity had not been expected to be a significant problem and the costs of wear and tear on the track had been underestimated.²⁸

In practice, instead of cutting services, operators saw that the best way of improving their financial position was to expand the number of services. This contributed to the increase in train km which resulted in the network becoming increasingly congested and service performance deteriorating.²⁹

Also, research showed that the variable proportion of Railtrack's costs was not 8%, as used for the first review period, but about 20%. Therefore Railtrack had little or no incentive to accommodate growth in services, especially if that meant investing in extra capacity as it could not pass on these costs to customers. Indeed Railtrack often had an incentive not to accommodate growth, if that involved spending money.

For the second review period, the Regulator therefore increased the variable element of track access charges from around 8% to 20%. This higher proportion has been achieved by:

- Increasing the usage charge per vehicle km (differentiated by vehicle type) to reflect more accurately the causation of maintenance and renewal costs.
- Introducing a pre-determined capacity charge to reflect the increased congestion costs incurred by Railtrack when operators introduce additional services. The capacity charge is determined by train km operated.
- Introducing a volume incentive to Railtrack to encourage it to promote the use and development of the network. The payment (from the train operator) is determined by growth in train km, and in farebox revenue for passenger operators and in gross tonne km for freight operators.

The capacity charge and volume incentive replaced the negotiated charges (agreed with individual operators) for additional paths that had developed since privatisation, mainly for freight.

The performance regimes established for the first review period were considered to have failed to provide adequate incentives for Railtrack to reduce the delays that it caused to trains. For the second review period, the Regulator changed the regime in a way that roughly doubled the penalty/incentive payment rates applicable when Railtrack is responsible for a delay.

A “free possessions allowance” (the allowed time for Railtrack to “possess” track for engineering work) was established for the first review period. However, this gave no incentive to Railtrack to reduce the time it possessed the track for maintenance. These allowances were therefore removed for the second review period and Network Rail now pays compensation for all possessions.

4.3. Specific provisions for freight

In reviewing access charges for freight in Britain, it is important to bear in mind that freight services are run on a railway that is essentially for passengers. Rail freight has, for many years, been treated as a marginal user of the network. Track access charges for freight services have therefore been treated differently from those for passenger services.

In 1995, before privatisation, the Regulator published his initial criteria for approval of access charges for freight. The criteria were that:

- The structure of charges should reflect the value of access to users and should enable Railtrack to recover its total freight specific avoidable costs, plus any expected contribution to shared common costs.³⁰
- Charges must lie below standalone costs (the costs of providing a separate freight only railway).
- Charges for one operator should be neither higher nor lower than for other operators taking into account specific factors related to the services provided.

Until March 2001 (the end of the first review period), Railtrack’s charges for freight were negotiated with individual operators, though they had to be approved by the Regulator. This made it difficult for new operators to enter the market, as they did not have the bargaining power of established operators and might therefore pay higher access fees.

Also, track access charges represented a significant proportion of rail freight costs. For example, track access charges paid by EWS,³¹ represented 37% of their total cost. Access charges were therefore likely to have had a direct impact on the choice between rail and road transport in all cases where road is a realistic alternative. Despite the high share of access charges in total rail freight costs, Railtrack claimed that the track access charges provided it with little financial incentives to improve its services to rail freight and in practice it did little to encourage freight by rail.

In setting charges for the second review period, the Rail Regulator took account of problems experienced during the first period as well as the changes in the structure of the rail freight industry, particularly the increase in on-track competition as EWS lost market share. He concluded that, for the second review period, the following changes would be made:³²

- A more deterministic and transparent approach would be used (as for passenger services) to replace negotiated charges by charges, based on defined criteria published by the Regulator³³ – this is aimed at facilitating competition, reducing barriers to entry and encouraging new operators and customers.
- The scope for negotiations will therefore be reduced although some flexibility may be retained for negotiation at the margin on matters such as the split between fixed and variable costs and the performance regime.
- Charges for most commodities would be based on avoidable cost assuming longer-term efficiency gains – this provides a stable charging regime and is aimed at preventing the

possible irreversible switch of traffic to road.³⁴ The objective was to bring forward the impact on prices of the long term efficiency gains prescribed for Railtrack by the Regulator. Effectively the costs prescribed 10 years in the future were used as the basis of pricing today.

- Charges for coal and iron ore would reflect only half these efficiency gains – this is because road competition for these commodities is weaker and higher charges are not expected to lead to a switch to road.
- Capacity charges would be introduced (as for passenger services) but these would be reduced if the operator agreed to increase Railtrack's right to “flex” (adjust) the timetable or if an operator introduced rolling stock which was capable of speeds closer to those of passenger trains – these reductions were aimed at encouraging the more efficient use of capacity.
- A volume related adjustment would be introduced (as for passenger services).
- Charges would be reduced for track friendly suspension.

Overall, charges have been reduced by about 50%, thereby encouraging freight to switch to rail, in line with Government policy. The SRA has agreed to fund the gap created by this reduction and to pay for the freight specific costs of major enhancements to the network.

4.4. Freight rates and passenger tariffs

Freight rates and passenger tariffs are determined differently in Britain's privatised railway and there have so far been no changes since privatisation.

Freight rates are determined entirely through the market. There is intense competition from lorries in most markets in which rail operates (though competition is weaker for coal and iron ore). Also, since privatisation, there has been open access for rail, which means that rail freight markets are now contestable.³⁵

The SRA, as specifier and manager of passenger franchise contracts, controls some passenger tariffs, including season ticket prices for commuters (for which railways have monopoly power) and non-booked tickets for long distance trips.³⁶ For each type of ticket, there is a price escalation formula which allows prices to increase in line at 1% p.a. below inflation, with an adjustment made for each operator's performance, in terms of delays, during the previous year.

There are many ticket types for which demand is sensitive to price. For these, tariffs are unregulated and left to the operator to determine based on commercial considerations. These tickets types include: the first class surcharge,³⁷ booked tickets for long distance trips and most short distance trips not using season tickets.

Over the period 1995-2002, average unregulated standard fares increased by 27% (although some fell due to market pressures and the introduction of airline style yield management techniques) but average regulated fares increased by only 12% (slower than inflation).

Passenger train operating companies also co-operate to sell annual Travel Cards to passengers under 26 or over 60, to families and to the disabled (in the London commuting area, a Card with more limited entitlements is available to the whole population). In exchange for an annual payment, card-holders are entitled to a one third discount for off-peak fares. Similarly, discounts are available for off-peak travel by other passengers, and

for groups. These discounts are however commercial and are not controlled through the franchise contract.

4.5. Link between final charges access charges

Freight rates and passenger tariffs should be sufficient to allow train operators to recover all their costs, including track access charges, less any subsidies. However, in Britain, neither is linked to track access charges.

In Britain, rail freight rates are not regulated since there is intense competition from road transport³⁸ and customers have a choice of rail operator (including operating on their own account). Rail freight operators are not normally subsidised and so any change in track access charges must either be reflected in changes to rates charged to customers or in operator profitability. In practice, a combination of the two occurs, depending on the competitive position of the rail operator against other rail operators and road operators, and the other choices available to customers (*e.g.* alternative sourcing of inputs).

Any change in track access charges for franchised passenger operators are passed through to the SRA, which manages franchises. There is therefore no link between track access charges and passenger tariffs which, as described above, are determined by a different regulatory process.

5. Infrastructure management and planning issues

The management and planning of infrastructure has been the source of major problems since privatisation. It had not originally been envisaged that Railtrack, the infrastructure manager, would be privatised but the Government changed its mind during the franchising process. Had Railtrack remained in the public sector, it would not have been subject to the short term financial pressure that fits poorly with the long term approach needed for the development of the railways. However, railway infrastructure had suffered from a shortage of investment over more than 20 years prior to privatisation and the necessary investment to make up for that shortfall could not have reasonably been expected in the short term. On the other hand, it is unlikely the necessary investment would have been made if it had remained in the public sector either.

The two main problems that arose in the infrastructure area were:

- The escalation of costs associated with infrastructure works which has appeared in recent years.
- The organisational issues surrounding the stewardship and long term planning of network infrastructure.

These are discussed in turn below.

5.1. Cost increases

The costs of maintaining, renewing and enhancing infrastructure have increased dramatically in the last few years and this is now threatening the realisation of proposed renewal and upgrading plans. In particular, the estimated costs of expanding capacity have increased dramatically, as the high costs of growth have begun to be understood. This is partly a temporary problem, as requirements for renewals are at a peak in the cycle, but it is partly structural and permanent and it is now the biggest problem facing Britain's railways. There are several reasons for the inflation in costs:³⁹

- a) When Railtrack took over assets from British Rail, there was a lack of knowledge about the condition of assets and Railtrack was slow to rectify this situation.
- b) The transactions costs of negotiating, agreeing, drawing up, monitoring and enforcing contracts between so many industry parties for complex projects are substantial. Under British Rail, most of these relationships were administered through internal management.
- c) Network Rail must compensate operators for any delays or cancellations of services caused by infrastructure work. These sums can be considerable and are getting bigger as growth has made it more disruptive for it to gain access to the network to carry out the work.⁴⁰ These payments represent genuine costs, but adding them to the cost of projects increases budgetary problems and, where budgets are constrained, projects are less likely to go ahead.
- d) There has been a major increase in safety spending, partly due to public reaction to train accidents since privatisation.⁴¹ For example, TOCs have been required to install the Train Protection and Warning System which automatically overrides the driver to prevent trains from passing signals at danger.⁴² There is a risk of even greater safety expenditure being undertaken on the European Train Control System. Ironically, the effect of these expenditures is to increase rail costs and so divert more traffic to roads, resulting in a decline in the safety of the overall transport system.
- e) Whereas the public sector pools risk, private sector contractors include substantial risk premiums in their prices, partly because the private sector is being asked to take on much of the risk in the industry.
- f) The rapid increase in activities, following many years of relatively low investment, has resulted in a sharp increase in the demand for a number of scarce skills, which has bid up their price. At the same time, the fragmentation of the industry has meant that recruitment, training and development have been reduced.⁴³ Although the skill shortage is now being addressed, it will take time to resolve.

The contracting out of track maintenance and renewal has caused more problems than would have been expected by observing experience of contracting out in other industries. One reason was that Railtrack's poor knowledge of the state of its assets made the monitoring of performance and safety standards more difficult. The relationship between Railtrack and its subcontractors proved to be one of the most problematic aspects of the railways after privatisation. Network Rail is now taking some track work "in house" to allow it to benchmark cost and act as a more informed buyer.

The costs of rail projects could be reduced if the SRA accepted more risk, allowing contractors to reduce risk premiums.

The rail industry also needs to control the expenditure on marginal safety schemes which distort rail costs relative to road. However, there is no body responsible for balancing safety and cost and, if anything, safety regulation of the rail industry is becoming even more burdensome, with new initiatives by the British Government and the EU.

The SRA, the Regulator and Network Rail are currently undertaking a review of costs. The aim of this, as of other co-ordination initiatives, is to get the industry and its regulators to work together in a way that retains the advantages of the fragmented structure (clear accountability and focused management) whilst trying to re-establish some of the advantages of vertical integration.

5.2. Stewardship of the network, planning and investment

A key problem identified by Britain rail industry itself⁴⁴ was a lack of leadership in the industry, which led to poor strategic planning and a failure to identify an appropriate investment strategy. This point was echoed by the current Chairman of the SRA, when he said: “We need one plan, where all costs, benefits and risks associated with investing in rail can be clearly identified and analysed.”

The original structure of the privatised rail industry depended on both Railtrack and the ROSCOs to lead investment in the industry – the former for network aspects and the latter for rolling stock. The intention was that Railtrack would face sufficient incentives to maintain the system appropriately through the track access agreement, particularly through the performance regime which set out the penalties it would have to pay for delays and cancellation to trains for which it is responsible. For enhancement of the network, Railtrack was expected either to invest at its own risk, where it saw opportunities for selling capacity at commercially attractive prices, or to rely on agreements with TOCs to pay for enhanced infrastructure. The Regulator was expected to allow Railtrack to recoup the costs of enhancements through higher track access charges.

The main problem with this structure was that there was no leading organisation which could provide a strategic focus to help the others plan their investment strategies. For example, rolling stock must be ordered in accordance with the specifications of the infrastructure on which it will operate, but there was no organisation responsible for making sure the decisions are made on the basis of total industry costs. One expensive example of this lack of co-ordination in planning occurred with the replacement of rolling stock south of London. No one analysed the ability of the existing power supply system to meet the increased demands of the new rolling stock as it was unclear who had responsibility for doing so. It is now known that the power system needs to be replaced at an expected cost of nearly £1 billion.

Until recently, there has also been little questioning of whether the entire network had a long-term future. Successive governments had sought to maintain the *status quo*. Railtrack was initially funded on the basis of the need to renew all its assets in “modern equivalent form”⁴⁵ which was based on the assumption that the network would remain unchanged in size. This resulted in excessive expenditure on some lightly used sections of infrastructure but under-expenditure on some congested sections where investment was urgently needed.

Since Railtrack was at the centre of the industry and had to try to reconcile many competing demands, it was best placed to act as the industry’s strategic leader. However, as a private company, it had a short term, risk-averse attitude which ruled this out.⁴⁶ Also, as a profit maximizing monopolist, its relations with operators were often antagonistic and information was not willingly shared. The Regulator could not be the strategic leader since its role was not to direct the industry, but rather to act as a referee. There was therefore no organisation with sufficient breadth of view and an appropriate role to adopt a strategic leadership role.

This situation led to the creation of the Strategic Rail Authority in 2001. The SRA is firmly taking on the role of leader in the industry although it often gets involved in too much detail. Getting the balance right between strategic control and leaving matters for the industry and the market to decide is now a key challenge for the SRA.

6. Conclusions

Following a complex privatisation, which was planned and implemented in a hurry, there has been a period of growing turbulence and uncertainty in the rail industry in Britain. However, there have been some notable successes, particularly the unexpectedly high rate of growth in traffic which, in the case of passenger traffic, partly arose as a result of the successful franchising model. Experience with ROSCOs has also been positive, leading to increased investment and reduced life cycle costs. However, there were a number of weaknesses in the original franchising model including an excessive number of franchises, simplistic criteria for evaluating bids and inadequate provisions to cope with the growth that was implicit in the winning bids.

Growth was also strong in freight traffic, reversing an apparently terminal decline. This was partly because a private and competitive freight sector made significant investments and provided higher quality services to its customers although changes in the sourcing of coal for power stations explained much of the increase.

The original framework for infrastructure management proved unsuitable for the dealing with consequences of growth and with other emerging problems. A number of changes were necessary, notably the removal of private equity interests from infrastructure management. Private equity interests in infrastructure management led to too much focus on short-term financial performance, introduced mistrust and prevented constructive negotiations regarding the use and planning of network capacity. This suggests that, in cases where it is separated from train operations, infrastructure management should be the last rail activity to privatise, if indeed it is wise to privatise it at all.

The regulatory and contractual structure remains largely unchanged since privatisation but it was found that the information requirements for planning and running a railway are too high for a completely decentralised approach. There has therefore been a return to a degree of central planning and strategic leadership with the creation of the SRA – both in the specification of passenger train services and in the planning, specification and funding of network infrastructure projects.

The general lessons from the British experience are that:

- a) Although rail privatisation involved a major restructuring of the industry, it did not (and probably could not) achieve a genuine liberalisation of markets in the industry, particularly the market for access. The regulatory conditions, reflecting political and social concerns, as well as practical considerations, constrained the development of a market for train paths. This resulted initially in an *ad hoc* process for capacity allocation and eventually to a return to a more centrally planned approach, guided by cost benefit analysis.⁴⁷
- b) Long-term capacity planning has substantial information requirements and this is difficult within a decentralised framework. It is probably inevitable that long term infrastructure planning requires an administrative approach, given the fragmented structure in Britain and the many interlinkages between the parts.
- c) The information requirements for the successful specification, monitoring and enforcement of contracting out of track works are also high. Experience suggests that it is probably better for the infrastructure manager to maintain an in house capability against which to benchmark and inform its contracting out.
- d) The nature of railway organisations makes them susceptible to burdensome safety regulations, especially in comparison to the road sector, which has paradoxical results in

overall transport safety. It is important that the safety regulatory burden does not become too onerous.

Turning to financing, the main conclusions that can be drawn from the British experience are that:

- a) The model of establishing operators who are responsible for train services, but not for infrastructure or for provision of rolling stock, was an effective way of reducing the cost risk to operators and increasing the number of bidders (thereby increasing value for money).
- b) Channelling all funding through franchise payments worked less well – it was initially successful in stabilising public sector support to the industry, but the infrastructure manager had inadequate incentives to invest for growth. The financial crisis in the industry has re-introduced the potential for instability in public sector support, part of which is now made directly to Network Rail.
- c) For passenger operations, competition “for the market” through a franchise bidding process was broadly effective, partly because the bus industry had earlier been privatised and this meant there were many bidders for franchises.
- d) The “least subsidy” criterion for choosing the winners of franchise competitions, whilst simple and fast, did not generally lead to improvements in the quality of railway services, especially for highly subsidised services.
- e) The franchise contracts transferred too much revenue risk to operators but, when the operators began to lose money, additional payments were made, thereby effectively transferring some of the risk back to the public sector.

The new approach to franchising addresses some of these weaknesses, though it may produce new problems, not least because it is highly bureaucratic and interventionist, may be costly to supervise and leaves limited scope for franchise operators to respond to commercial forces within the improved incentive framework. However, it is too early to judge as tendering has only just begun for the first franchise using this approach (Greater Anglia, east of London).

The relevance to Russia of any lessons from the British experience will depend, to a large extent, on the institutional framework adopted for Russian Railways, as well as government policy and funding. If there is vertical separation of infrastructure and if independent freight operators are allowed to compete and operate over the same track in Russia, the British experience with regulated track access charges and passenger tariffs, and deregulated freight rates will be relevant, particularly in relation to the following features:

- The initial framework for freight track access charges based on negotiations, but reflecting also: the value of access to users; the need to allow the infrastructure manager to recover its total freight specific avoidable costs; the need to ensure charges do not differ between train operators running equivalent services.
- Its later adjustment to provide a more transparent set of charges to facilitate the entry of new operators.
- The importance of the incentives created by the access charging regime, both to train operators and to the infrastructure manager, to provide, expand, improve or restrict services.
- The major impact of changes in costs faced by competing modes and the need to adjust access charges or face major shifts of traffic away from rail.

As with other elements of the reform of monopoly industries, it is not possible to get everything right concerning track access charges first time round. It is not possible to predict the precise consequences of reform, especially where deep changes are involved. Also, markets, industry structures and other circumstances change. Any framework therefore needs to be designed with flexibility to evolve in the light of experience and the changing market environment.

Notes

1. Part of this annex is based on a paper for the Seoul World Conference on Transport Research, 2001, "Rail Infrastructure Charging in Europe – Principles and Practice" by Chris Nash, Bryan Mathews and Gerard Whelan, Institute for Transport Studies, University of Leeds.
2. Railways in Britain (England, Scotland and Wales) only were privatised, not those in Northern Ireland, the other part of the UK.
3. Such as Intercity passenger services.
4. The electricity, gas and telecommunications industries.
5. The Post Office remains in public ownership.
6. From a privately owned joint stock company (Railtrack) into a "not for profit" company, limited by guarantee (Network Rail is financed entirely by debt, with the government providing a guarantee).
7. Through ticketing means tickets can be bought from all stations to all stations in the country and interchangeable ticketing means that all operators on each valid route accept each others tickets.
8. Although ownership has changed, there have typically been about eight groups with franchises.
9. One of the bad practices that had emerged in the bus industry after its privatisation had been that new entrants had operated services minutes before the incumbent's services, rather than spreading services evenly, and the Regulator wished to avoid this happening in the railways.
10. In theory, all paths could have been auctioned but, in practice, the complexity of the rail network in Britain, makes this too unwieldy. The market is also distorted by externalities.
11. After initial cuts (mainly in management staff), operators increased staff on trains to improve customer service.
12. Regional services mainly comprise commuter services to cities other than London, services between those cities and other towns and rural services.
13. Gross cost contracts involve the operator taking no revenue risk and are more like management contracts.
14. Revenue support consists of annual payments to support commercial revenue, where this is inadequate.
15. The figure for 2003 is expected to be higher still.
16. *Franchising Policy Statement*, SRA, November 2002.
17. This is a simplified version of the scheme introduced for the London Underground Public Private Partnership where the private consortia are responsible for the provision and maintenance of infrastructure and trains, but not their operation.
18. Track Access Grants are paid to specific operators and are to be largely replaced by a Company Neutral Scheme in 2003. This will tie payments to flows of traffic, rather than to a specific operator, and will thereby encourage competition.
19. By comparison, the total costs incurred by freight operators (~£700 million) represent slightly over 10% of total revenue to the rail industry (~£6 billion).
20. *An Examination of Rail Infrastructure Charges*, NERA, Report for the European Commission, May 1998.
21. The Infrastructure Manager was Railtrack until 2002 when it was renamed Network Rail.
22. Annex A sets out some elements of the theory behind track access charges.
23. Income from sources such as property is not regulated although the Regulator takes account of the expected level of unregulated income in determining access charges.

24. This is the value of the assets owned by Network Rail and used by train operators and is the basis for estimating the total regulated revenue required by Network Rail.
25. The initial periodic review took place before the sale of Railtrack and so its value was based instead on the Modern Equivalent Asset value defined as one that provides the same service potential as the existing assets but takes account of modern technology.
26. Railtrack's failure to invest in the network after privatisation resulted first in the creation of a new government agency, the SRA to carry out strategic planning and take over all financing of the rail system. As part of its overall role in financing rail operations the SRA took over the former role of the Office of Passenger Rail Franchising. Railtrack's incompetence later caused its bankruptcy and its replacement with Network Rail, a not for profit company on whose board rail operators and other railway interests are represented.
27. Passenger operators were also prevented from cutting some services by Public Services Requirements set out in their franchise agreements.
28. Railtrack also lacked knowledge of the true capacity of its network.
29. The term performance is used to refer to train cancellations and delays.
30. Costs arising from both freight and passenger services and which cannot be allocated between them.
31. English, Welsh and Scottish Railways (EWS) carried about 90% of freight traffic then although the proportion has since declined as its three competitors have won traffic from EWS.
32. *Review of Freight Charging Policy: Final Conclusions*, Office of the Rail Regulator, October 2001.
33. *Review of Freight Charging Policy: Emerging Views on Key Issues*, Office of the Rail Regulator, August 2000 and *Review of Freight Charging Policy: Consultation on Costs*, November 2000.
34. This change was made in response to a sharp reduction in fuel duty and annual vehicle taxes for road haulage.
35. If a customer is dissatisfied with the services it receives, it can transport freight on its own account or use another operator.
36. Regulation of these fares is largely for political reasons. It is difficult to justify with economic arguments because rail's share is arguably too small in this market to justify regulation and there is effective competition from private cars, airlines, buses and coaches. It may be abolished.
37. Although the first class surcharge over standard full fares remains at 50% for most trips.
38. For this reason, they were not regulated for many years before privatisation.
39. There was also a major accident at Hatfield in 2000 which was a major factor triggering a series of events that led to Railtrack's bankruptcy in 2001 and contributed to the current cash crisis on the railways.
40. A major station remodelling project at Leeds triggered approximately £100 m in such payments and compensation typically represents 40% of the cost of track upgrading.
41. In fact, passengers deaths and injuries, due to accidents, have been lower since privatisation than before it.
42. This system costs approximately £10 m per life saved which far exceeds the figure used in appraising road investments with safety implications.
43. Ironically, this has meant that salaries in the industry have increased substantially, particularly for drivers, and the then government's aim, at privatisation, of reducing wage costs by breaking the unions, has not been achieved.
44. Mercer (May 2002): *The GB Rail Industry: In its Own Words. Problems & Solutions*.
45. Modern Equivalent form is one that provides the same service potential as the existing assets but takes account of modern technology.
46. The Government eventually wound Railtrack up in 2001 and set in place the "not for profit" Network Rail to take over stewardship of the network in 2002.
47. The variable element of charges has also been increased to make them reflect more fully variable costs, as discussed in the accompanying paper on access charges, but these have not directly addressed the issue of capacity allocation.

APPENDIX

The theory behind rail infrastructure charges

Background and objectives

The issue of user charges for railway infrastructure has become important because of the separation of infrastructure from operations. Also the introduction of access to the infrastructure for new operators means that an issue arises concerning potential discrimination between operators.

There are a number of possible objectives for rail infrastructure charges, principally:

1. Recovering the costs of providing the infrastructure, including adequate funding for investment, and ensuring that infrastructure is provided efficiently.
2. Promoting efficient use of the infrastructure.
3. Promoting efficiency of operators, for instance through facilitating competition.
4. Harmonising the terms of competition between modes.

Clearly there are trade-offs between these objectives and not all these objectives can be adequately fulfilled through track access charges. Also, some are more important than others and typically the most important are the first two: recovering the costs of providing the infrastructure and efficient use of the infrastructure. However, these should be achieved in the way which is least damaging to the other objectives.

It is accepted by both the EU and the UK Rail Regulator that charges should be non-discriminatory and based on short run marginal cost, and this approach meets objectives 2 to 4. This approach may not, however, allow the network operator to fund development of the network (objective 1). The long term marginal cost therefore needs to be considered. Both short run and long run marginal costs are discussed below.

Short run marginal costs

The short run marginal costs generated when an additional train uses the infrastructure are not just the use-related wear and tear costs, as is commonly supposed, although wear and tear costs are normally the biggest component. There are also short run marginal costs from: congestion and scarcity; safety; and environmental.

Wear and tear of track

Wear and tear of railway track is caused by a combination of usage-related and time-related damage. The need to inspect, maintain and renew the track gives rise to costs.

Usage-related wear and tear costs are the proportion of inspection, maintenance and renewal costs which result from trains using, and hence causing damage to, the track.

Congestion and scarcity

For efficient use of infrastructure, in the absence of capacity constraints and externalities, operators who are willing to pay the wear and tear costs they impose by their use of the infrastructure should be allowed to use it. Where there are capacity constraints, however, their use of the infrastructure has an opportunity cost since other users would be excluded: efficient use of the infrastructure is then ensured when the capacity is allocated to the operator and type of traffic for which the net social value is highest. The net social value is the value of the path to the operator and its customers, plus any benefits from reduction in road congestion, accidents and environmental impact which result from traffic switching to rail, less use-related wear and tear costs, external accident costs and environmental costs associated with the path.

On roads, congestion usually arises because large volumes of traffic cause speeds to fall below their free-flow speed and/or to queuing at junctions. Since rail infrastructure managers control access to the network on a planned basis, shortage of capacity can have two consequences: congestion and scarcity.

Congestion represents the expected delays resulting from the transmission of delays from one train to another. These become worse at high levels of capacity utilisation, since there is a lack of spare capacity to recover from any delays. Congestion costs are the costs associated with these expected delays.

Scarcity arises when an operator is unable to obtain the path it wants, in terms of departure time, stopping pattern or speed. Therefore, in the presence of a capacity constraint, the value of another train which could not be run (the opportunity cost) should be added to the other costs.

Safety costs

Whilst rail is a relatively safe mode, there are costs arising out of railway accidents. When travellers use a rail service, they expose themselves to the average accident risk on that service. Moreover, part of the costs of accidents may be imposed on third parties and not recovered from the rail company or its insurers. The marginal accident cost is the economic value of these consequences of additional rail use.

Environmental costs

Again rail causes fewer environmental costs than other modes but environmental costs do arise from the impacts of local and regional air pollution, global warming and noise emitted by railways. Several methods have been developed for valuing these impacts and extensive national and international research has been conducted over the past decade to derive actual values.

Social value

To maximise the efficiency of use of infrastructure, operators should be charged the short run marginal cost, which represents the incremental, or marginal, cost of the use of existing infrastructure by the train concerned, given the other trains on the network. However, the price the operator is willing to pay for access will rarely represent the social

value of operating the train service. This is because there are often unpriced user benefits or external benefits or costs from that service. Ideally these should be taken into account by taxes or subsidies from the government but this can be both technically and politically difficult. Pricing alone will therefore be insufficient to allocate track capacity and will need to be supplemented by administrative controls (rationing).

Long-run marginal costs

The concept of short-run marginal cost is often contrasted with that of long-run marginal cost, which represents the additional cost of an extra train, including the cost of adapting infrastructure to meet demand. If the infrastructure were optimally configured, the two concepts would give the same value, since the infrastructure would be improved to the point at which the cost of the extra capacity exactly matched its value in terms of relieving congestion and permitting additional trains to run. The general perception that short run marginal cost is below long run is only true in the presence of excess capacity; the reverse is true when capacity is scarce, as is the case on some lines in Britain and in some other West European countries.

In practice, the indivisibilities and the time lags involved in adapting infrastructure to volume mean that differences between short and long run marginal costs are likely. Where short and long run marginal costs diverge, the theoretically correct approach is to price at short run marginal cost, whilst adapting the infrastructure in accordance with the outcome of social cost-benefit analysis of alternative schemes.

In this way, the optimal use of existing infrastructure can be guaranteed, whilst over time, the quantity and quality of infrastructure would be optimised, and the price adapted accordingly. Both the European Commission and the Office of the Rail Regulator in Britain have essentially concluded that the variable element of rail infrastructure charges should be related to short run marginal cost. Fixed charges or other mark-ups would be used to meet financial needs, when the revenues produced from tariffs, based short run marginal costs, do not meet government or business cost recovery targets.

ANNEX C

*Experiences in Germany with DB Netz AG's 1998
and 2001 route pricing system*

by

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1. Introduction

The principle of full recovery of costs is at the heart of both the old and new route pricing systems implemented by DB Netz AG. Comparable systems exist in France, Belgium, Italy and Austria. Financial support from the state is such, however, that the level of costs to be recovered is way below 100%.

This document describes the route pricing systems introduced by Germany's leading infrastructure operator (DB Netz AG). It includes a comparison and brief assessment. The exact nature of the changes that will have to be made to the present system (2001 route pricing system) when the 1st European Railway Package is incorporated into German domestic law remains to be seen.

2. 1998 route pricing system

The 1998 system was a two-part system. Its principal advantage compared with a one-part system was that it offered an incentive to purchase additional slots. Critics of the system claim, however, that it encouraged unfair competition, insofar as the reduced price available to well-established frequent users meant they were entitled to significant discounts that were not available to the same extent to newcomers who tended to book fewer slots.

The price component that applied to all users ("Vario" price) was based on the line category, with lines operating at higher average speeds costing far more than lines operating at lower speeds, and the line load factor that was determined by capacity utilisation.

Operators purchasing a network card (*Infracard*) could obtain a reduction on the "Vario" price in respect of certain lines. Purchase of the card was only possible in relation to minimum stretches of connecting route sections: 100 km for local passenger traffic, 500 km for rail freight traffic, and 1 000 km for long-distance passenger traffic. Below these limits purchase of the network card was not possible, and even in the case of higher train frequency the higher "Vario" price still applied. The card enabled operators to purchase any number of slots on a given route at a variable price that was much lower than the "Vario" price. With such a two-part system, the average price per train-kilometre, i.e. the variable price plus the percentage cost of the network card, goes down as train frequency increases. By increasing the frequency of their trains, operators are able to recoup the full cost of the network card. The point where they break even, where, in other words, it is actually worth their while to purchase the card, depends on the line category and time commitment, the load factor and timetable flexibility. With the lowest degree of flexibility permitting between 20 and 40 trains per day over standard and high quality lines and by combining discount factors, it would be possible for frequent operators to make cost-savings well in excess of 50%.

Proceedings were initiated by the Federal Railway Office in respect of the 1998 system in an attempt to resolve a number of disputes relating to infrastructure access. The case was subsequently dropped, however, after DB Netz AG submitted settlement bids that resulted in applicants' withdrawing their complaints. The Federal Railway Office had

argued that the discounts available to track users who purchased the network card amounted to a line-based quantity discount that breached German law and in respect of which there was no accounting evidence of a corresponding cost-saving for the infrastructure operator. The Federal Railway Office also criticised the high entry point for the purchase of the network card, the minimum line stretches, the high break-even point, the effect of the highly degressive prices, and the fact that time-based rebates were only available to operators who purchased the card.

A number of local transport undertakings lodged complaints against the 1998 route pricing system with the Federal Cartel Office, and in early October 1999 the Federal Cartel Office initiated abusive practices proceedings against DB AG and DB Netz AG under Section 20 (1) of the ARC on the ground that the route pricing system meant DB AG's own subsidiaries were entitled to cost advantages that were denied to its competitors and for which there was no objective justification. The case was confined to local passenger traffic. In its decision on the case, the Federal Cartel Office found that the 1998 route pricing system constituted an abusive practice. It informed DB AG that unless the 1998 system was substantially modified it would be prohibited. It also set a number of targets. In response, DB AG announced its intention to adapt the system accordingly. The new system was introduced with effect from 1 January 2001.

3. 2001 Route pricing system

The main difference between the 1998 system and the 2001 system is that the previous two-part system was replaced by a one-part system, with the same route prices applicable to all track users, irrespective of how many slots they book.

The quantity discounts available under the previous system no longer apply.

With the 2001 system, the route price is composed of the basic price, a product factor, and, in some cases, a special factor.

The **basic price** depends on the line category of the route in question. The rail network as a whole has accordingly been divided up into the long-distance network (6 categories), branch lines (2 categories), and *S-Bahn* suburban lines (1 category).

These categories take account of the cost of equipping the different lines and subsequent maintenance costs.

The basic price also includes a load factor (1.2) for sections of line with very high traffic density. The aim here is to encourage operators to use lines where capacity utilisation so far has been poor. There is no distinction made at this level between different types of traffic.

A distinction is made however between different **products**. They are divided into four premium and three standard routes, each weighted with product factors.

Premium products are clockface services operated over short and long-distance routes and the very fast express routes (passenger and freight), while standard products are non-clockface services operated over short and long-distance routes, slower freight routes and feeder services.

The intention with product factors is to ensure that the route price reflects customers' planning and quality requirements and the fact that some types of traffic are more economically viable than others. Timetabling of clockface services with their rigid departure and arrival times that have to tie in with other services is very costly, for example, and limits infrastructure availability.

There is also an additional, graduated load factor component for heavy goods traffic in excess of 1 200 tonnes that is intended to take into account the extra strain on the track, particularly in terms of line maintenance.

The route price is also sometimes composed of **special factors** that take account of exceptional service features such as out-of-gauge loads or the use of routes at times other than the normal slots, all of which result in extra cost for DB Netz AG.

The route price is therefore the combination of the basic price, product factor and possible load factor, plus any supplements that may apply as a result of exceptional service features.

On 1 January 2003 regional factors were included as an additional component of the overall route price. They apply in the case of lines with no viable medium-term cost-benefit structure and have been devised for each regional network, with local differences. They amount to a surcharge on top of the route price. Use of regional factors is limited to local passenger services as the main services operating on regional lines.

If slots are cancelled, compensation must be paid. For every slot booking cancelled less than three hours before the scheduled departure, a lump-sum fee is charged in addition to the route price and irrespective of the particular route.

Critics claim that even with this relatively straightforward system of route pricing discrimination is still possible through, for example, deliberate over-pricing of routes that are particularly attractive to new transport undertakings or are likely to be in future, or, conversely, the deliberate under-pricing of routes where for the foreseeable future there is likely to be least competition. They also claim there is a danger that such discrimination will exist in practice for as long as DB AG's network and railway services are part of the same company. Furthermore, there is no chance of DB AG's competitors' having access to degressive route prices as would have been possible, for example, with a virtual network card. This prevents them from strengthening their competitive position in relation to DB AG's own transport undertakings.

Critics see this as another severe drawback since, in their view, a virtual card could generate more traffic, which, from DB Netz AG's perspective, would have been a sensible way of making better use of existing capacity.

4. Detail of train-path pricing system 2001

The situation

DB Netz AG introduced a new single-tier train-path pricing system with effect from 1st April 2001. The new system continues to be designed around cost-coverage, transparency and competitive neutrality. The main consequence of the new train-path pricing system is that all DB Netz AG customers now operate at the same rate, irrespective of how much they contribute to ensuring utilisation of infrastructure.

Overview

Purchase of a train-path buys a package made up of the following basic services:
Production of a timetable together with dispatch to the orderer of timetable material needed for operations.
Use of open-line, station, passing and crossing-loop track provided for train movements.
Traffic management during scheduled staffing of our operating establishments.

Individually agreed dwell times prior to departure or following arrival of a train from its initial or to its final station (station utilisation charged separately).

Agreed scheduled stops during the train movement (station utilisation charged separately), see below.

There may be further charges for the use of assets. In passenger traffic, moreover, DB Station & Service AG may make further charges for station utilisation. Traction energy is not included in the price either. Additional charges may be levied for movements outside normal staffing hours.

Besides now being single-tier, the train-path pricing system 2001 is modular in design. In it, prices are determined by means of three components:

Pricing components

- a) Line Category and Load Factor ⇒ Basic Price
- b) Train-Path Products ⇒ Product Factor
- c) Surcharges and Discounts ⇒ Special Factors

Formula for the train-path price

basic price
 x product factor
 x special factors (steam loco run, out-of-gauge load)
 + special factors (weight class, axle load, tilting system)
 = **train-path price**

The components used to determine the price of a path are set out in greater detail below.

5. Line category and load factor (basic price)

Using technical operating criteria, a total of nine different line categories have been devised for the purpose of determining basic prices. This classification takes account both of infrastructural features and the significance of individual routes for traffic on the network as a whole.

Long-distance (F) lines

F1: This category embraces all lines that can be worked at speeds in excess of 200 km/h. Such lines are mainly reserved for high-speed transit.

F2: Lines that can be worked at speeds between 161-200 km/h are assigned to this category. Such lines are designed for mixed operations and hence for all types of traffic.

F3: F3-Category lines are for mixed traffic running for the most part at speeds of between 101-160 km/h.

F4: Category F4 comprises lines worked primarily by fast transregional traffic in the 101-160km/h speed range.

F5: F5-Category lines are predominantly for use by slow transregional traffic in the 101-120km/h speed range.

F6: Category F6 relates to lines that can be worked at speeds of between 101-160 km/h and are mainly used for local passenger train services.

Feeder lines (Z)

Z1: Category Z1 contains all lines that can be worked at speeds of up to 100 km/h. These lines are designed for mixed operations and hence for all types of traffic.

Z2: Covered by Category Z2 are all lines equipped with the most rudimentary command-control system or none at all and hence not capable of being travelled over at more than 50 km/h.

Urban rapid transit lines (S)

S1: S1-Category lines are primarily or exclusively reserved for urban rapid transit services.

The basic price for Categories F4 and F5 only applies if the reference speed is adhered to. Where this is not the case, we reserve the right to levy a surcharge. The design priorities published in the General Terms and Conditions for the Utilisation of Railway Infrastructure (ABN) also apply.

Table C.1. **Basic prices**

	Basic price	Basic price plus load factor
Long-distance lines		
F1	6.60 DM/km	7.92 DM/km
F2	4.40 DM/km	5.28 DM/km
F3	4.25 DM/km	5.10 DM/km
F4	4.15 DM/km	4.98 DM/km
F5	4.00 DM/km	4.80 DM/km
F6	3.75 DM/km	4.50 DM/km
Feeder lines		
Z1	4.15 DM/km	4.98 DM/km
Z2	4.30 DM/km	5.16 DM/km
Urban rapid transit lines		
S1	2.90 DM/km	3.48 DM/km

Load factor

As a means of improving the channelling of capacity and of shifting traffic flows to less busy lines, a 20% surcharge is being levied for particularly busy lines. Lines subject to this surcharge are indicated on the map in the Annex.

6. Train-path products (product factor)

DB Netz AG offers its passenger and freight traffic customers a variety of products. These are reflected in the train-path price by means of a multiplicative product factor. The products involved are delineated below.

7. Train-paths for passenger traffic

Express passenger train path

This offers the fastest through links between population centres in Germany outside the existing regular-interval system. Express paths are accorded top priority during planning and implementation. Numerous conflicting uses can arise in the process, and these need to be resolved in accordance with the relevant ABN provisions.

Regular-interval passenger train path

Regular-interval services involve at least three pairs of trains a day whose itinerary is identical for most of the journey (over 50%). They also involve the same or alternating scheduled stops at the same stopping times (± 5 minutes). Regular-interval paths can additionally be subdivided into local and long-distance traffic.

Local regular-interval passenger train paths embrace all local service train-paths, including urban rapid transit paths, interlinked by means of regular-interval and connecting services.

Long-distance regular-interval passenger train paths embrace all long-distance train paths interlinked by means of regular-interval and connecting services. They essentially also include paths for high-speed traffic, providing no special requirements are to be met in the planning of these paths.

Economy passenger train path

This path represents the most economical option both for local and long-distance passenger services not running at regular intervals. It was conceived for traffic types with limited economic potential (overnight trains, empty runs, field trials) and for which the train operator is only able to pay a comparatively low path price. DB Netz AG requires a certain amount of latitude in designing such paths so as to make the best possible use of its infrastructure.

8. Train paths for freight traffic

Express freight path

This offers very fast, highly reliable through links between key centres in Germany. Express paths enjoy top priority in the planning and running of traffic, not only within freight operations but also as against Economy passenger train paths. Numerous conflicting uses can arise in the process, and these need to be resolved in accordance with the relevant ABN provisions.

Standard freight path

This path is available for all freight train services. Standard freight paths are typically interlinked by means of connecting services and are subject to special restrictions such as fixed times of arrival at the consignee's. This provides DB Netz AG with points of reference when producing the timetable. In general, though, there are fewer conditions in freight than in passenger traffic. Accordingly, DB Netz AG is more flexible in drawing up the timetable, and this is reflected in the price of train paths.

Freight feeder path

Customers may order freight feeder paths for the purpose of conveying loaded and empty wagons between freight traffic stations and DB Netz AG train-formation facilities. These paths are only obtainable in conjunction with a Standard freight path. They are used within mixing-centre confines for the initial/concluding legs of long-distance freight operations.

To be eligible, the customer is required to use the services of a DB Netz AG train-formation facility before or after using a freight feeder path.

Table C.2. **Product factors**

	Product factor	
Passenger train paths		
Express path	1.80	(Premium)
L-D regular-interval path	1.65	(Premium)
Local regular-interval path	1.65	(Premium)
Economy path	1.00	(Standard)
Freight Train Paths		
Express path	1.65	(Premium)
Standard path	1.00	(Standard)
Feeder path	0.50	(Standard)

9. Surcharges and discounts (special factors)

A number of special factors additionally require consideration in the overall course of pricing. These are divided into multiplicative and additive special factors. Besides the surcharges and discounts set forth in Paragraph 6 Railway Infrastructure Usage Regulations (EIBV), which we are already to an extent able to incorporate into pricing – as described in Sections 5.1 and 5.2 – it is additionally possible to include:

a) Surcharges for:

- Train paths whose design and/or implementation are particularly input-intensive.
- Train paths for trains with vehicles that make particular demands on the infrastructure.

b) Discounts for:

- Train paths for special schemes of limited duration or only applicable over a limited area on specified transport services.
- Train paths for new transport offerings or products during the market-introduction phase (introductory offers).

Multiplicative special factors

A range of specific features are covered by multiplicative special factors. These currently include steam locomotive journeys and out-of-gauge loads. Factors such as noise or specific investment undertakings may be taken into account in the future.

Steam loco run ⇒ special factor 1.20

Out-of-gauge load ⇒ special factor 1.50

Additive special factors

There are additive special factors in place for load and tilt systems, though load factors are only of significance to freight and tilt system factors are only of significance to passenger traffic.

Freight trains weighing 1 200 t or more overall or with an axle load greater than 22.5 t are liable to surcharges that are added to the path price. The thinking behind this is as follows:

Track systems are subjected to varying levels of stress by trains. Decisive factors here are laden weight and axle loading. To enable this to be reflected in pricing, Weight Class and Axle Loading have been introduced as factors for heavy freight trains. A load surcharge per path kilometre is levied in such instances.

Table C.3. **Weight classes**

Weight	Special Factor
< 1 200 t	0.00 DM/km
1 200-1 599 t	1.00 DM/km
1 600-1 999 t	1.50 DM/km
2 000-2 399 t	2.10 DM/km
> 2 400 t	2.60 DM/km

Where axle loads exceed 22.5 t, a charge of 1.25 DM per kilometre is added to the train-path price.

Lines worked by tilting-body trains have to fulfil special requirements. Account is taken of this extra input through the special Tilt System factor. If a train with tilting-body technology travels over a line specially designed for such systems, an extra charge of 1.00 DM per applicable kilometre is added to the path price.

Extra charges may be levied to cover the actual costs incurred when paths are used outside scheduled staffing hours for operating establishments.

Figures: Summary of train path pricing system 2001

Figure C.1.

The new single-tier Train Path Pricing System contains three modular pricing determinants:

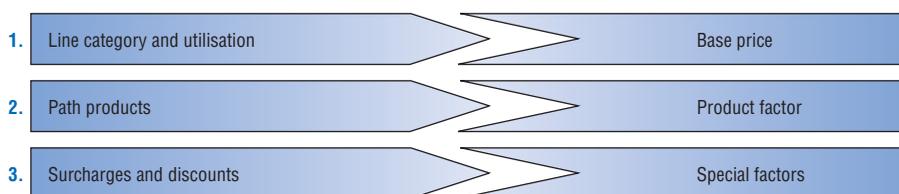


Figure C.2.

Breakdown of Modular Train Path Pricing System

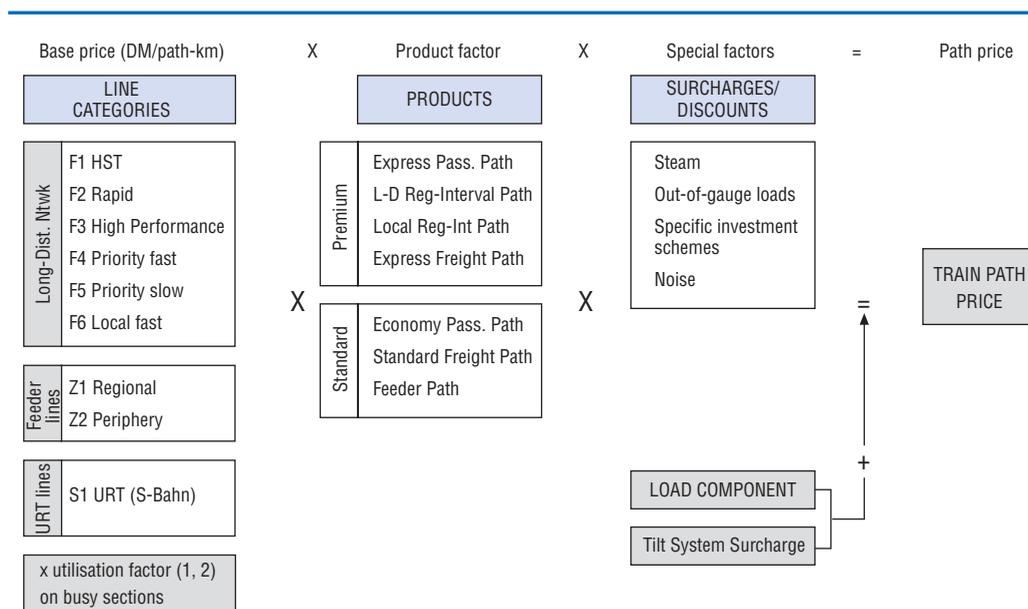


Figure C.3.

Line categories

Description of the new line categories			
Line category	Network 21	Type	Basic infrastructure parameters
Long-distance			
F 1	P300	High-speed line	Vmax > 200 km/h, OHL, double-track
F 2	P230/M230	Upgraded line	Vmax 161-200 km/h, OHL, double-track
F 3	M160	Mixed-traffic line	Vmax 101-160 km/h, OHL, double-track
F 4	P160 I + II	Priority for fast workings	Vmax 101-160 km/h, OHL, double-track
F 5	G120	Priority for slow workings	Vmax 101-120 km/h, OHL
F 6	R120	Fast local passenger services	Vmax 101-160 km/h
Feeder lines			
Z 1	R80	Complementary lines	Vmax 51-100 km/h
Z 2	G50	Freight railways (primarily)	Vmax < 51 km/h, simplest form of operation
Urban rapid transit			
S 1	P160I	Dedicated URT lines	Vmax to 120 km/h, OHL, double-track

The new concept of line classification is characterised by the following aspects, among others:

- categories more closely geared to Netz 21 line standards;
- according to some lines priority status and levying surcharges on particularly busy sections (Factor 1, 2) has an effect of channelling traffic;
- for the most part, end-to-end classification of routes between nodes and between centres of demand for traffic.

Figure C.4.

Train path products

Passenger train paths**Regular-interval paths***Local services*

Embraces all local-service paths interlinked by means of regular-interval and connecting services

Long-distance services

Embraces all long-distance paths interlinked by means of regular-interval and connecting services

Express path

Offers the fastest possible through links between population centres in Germany and is given top priority in planning and implementation terms (e.g. ICE Sprinter).

Economy path

Envisaged as an economical offering for both local and long-distance passenger services that do not run at regular intervals. Train operator gives network considerable latitude (+/- 30 minutes relative to application for departure, arrival and intermediate stops).

Figure C.5.

Train path products

Freight-traffic paths**Express path**

Offers the fastest possible (up to 160 km/h) links between major centres in Germany and is given top priority in planning and implementation terms.

Feeder path

Envisaged for pre- and post-forwarding movements relating to freight trains for single-wagon traffic in cases where DB Netz AG marshalling facilities are utilised in conjunction with the use of a Standard or Express path.

Standard path

Covers all freight paths that are neither Express nor Feeder paths, in particular unit trains and trains working the main leg of single-wagon operations.

Figure C.6.

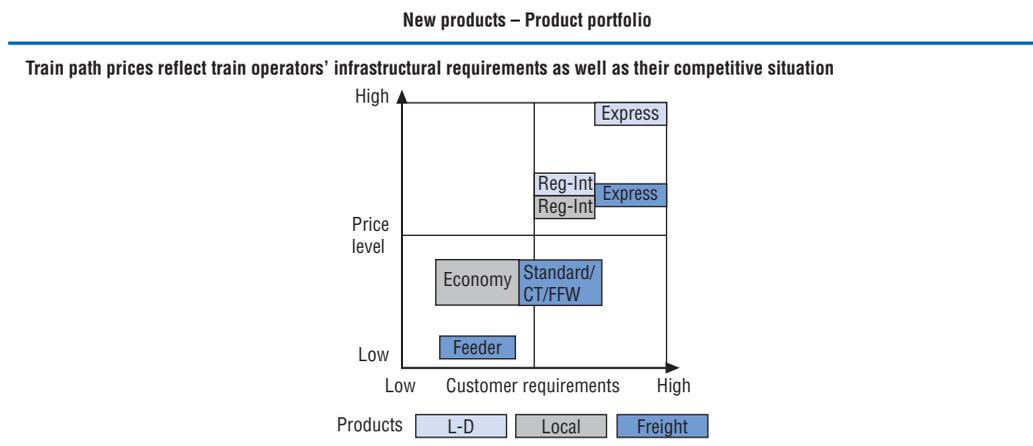


Figure C.7.

Price setting – Price tables/Product factors

Description of the new line categories

	Category	Base price [DM per path-km]	
Long-distance lines	F 1	6.60	X
	F 2	4.40	
	F 3	4.25	
	F 4	4.15	
	F 5	4.00	
	F 6	3.75	
Feeder lines	Z 1	4.15	
	Z 2	4.30	
URT lines	S 1	2.90	
X utilisation factor (1, 2) on very busy lines			
+ Dm 1.00 to 2.60 per path-km for trains > 1 200 t (depending on weight cluster)			

Product factors	
Passenger services	
Express path	1.80
Local regular-interval path	1.65
L-D regular-interval path	1.65
Economy path	1.00
Freight operations	
Express path	1.65
Standard path	1.00
Feeder path	0.50

Figure C.8.

Integrating loads: Threshold value 1 200 t

Surcharge in DM per path-km
One price per cluster upwards of 1 200 t
1 200-1 599 t: 1.00 DM per path-km
1 600-1 999 t: 1.50 DM per path-km
2 000-2 399 t: 2.10 DM per path-km
> 2 400 t: 2.60 DM per path-km

Figure C.9.

Special factors

Surcharge	TPS '01
Tilt system	1.00 DM/path-km
Steam	20%
Out-of-gauge loads	50%
Use of path outside working hours	Cost per staff hour ¹
Load	1 200 t upwards – tiered rates
Vehicles with axle load > 22.5 t	1.25 DM/path-km (+ load surcharge)
Noise	–

1. Surcharge levied in line with costs incurred.

ANNEX D

National rail infrastructure usage charges in Italy

by

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1. Regulatory references

Presidential Decree (DPR) No. 277/1998 “Regulation laying down enabling provisions for Directive 91/440/EEC on development of the Community’s railways”

Article 33 states that the infrastructure manager's accounts must exhibit a balanced trend between public funding and the revenue from the recovery of charges for the use of infrastructure (usage charges), on the one hand, and the costs relating to infrastructure management net of depreciation on the other. Article 7 identifies the persons within international groupings of railway undertakings, as well as those within railway undertakings, who must pay a charge for the use of rail infrastructure, and the person within the infrastructure manager's organisation who must levy and collect that charge; lays down the procedure for determining and revising the charge; determines the infrastructure management costs to be taken into account when determining the charge; and specifies the parameters to be used to determine usage and reservation charges.

Ministerial Decree No. 43T/2000 “Determination of the criteria applicable to rail infrastructure usage charges”

This Decree sets out the criteria for determining usage charges, including the reservation charge; determines the services to be provided by the infrastructure manager in return for payment of the usage charge; specifies the algorithm for calculating charges; sets out procedures for revising charges; in the annexes dealing with economic and technical issues respectively, determines the reference unit values and parameters relating to the physical and usage characteristics of the infrastructure required for the calculation of charges.

Ministerial Decree No. 138T/2000 “Management concession for the national rail infrastructure”

This Decree awards Ferrovie dello Stato SpA (FS), now Rete Ferroviaria Italiana SpA (RFI), a concession for the management of the national rail infrastructure in accordance with the provisions of Presidential Decree 277/1998; paragraph 5 of Article 3.c of the Decree specifies that one of the obligations incumbent on the concession holder is to levy and collect infrastructure access charges.

2. Procedure for establishing criteria for the determination of charges

In response to a proposal by the infrastructure manager, and on the basis of a written opinion issued previously by the CIPE [Interministerial Committee for Economic Planning] in Deliberation 180/1999, the criteria for determining usage charges for the national rail infrastructure network have been laid down by the Minister of Infrastructure and Transport in Ministerial Decree 43T/2000, published in Official Journal No. 94 of 21 April 2000. There have been no subsequent amendments or revisions made to the Decree since that date.

RFI, as the manager of the national rail infrastructure, applies the algorithm specified in the said Decree and calculates the charges relating to each train slot either scheduled or sold, and recovers, in accordance with the regulations applicable, the sums owed by the railway operators that make use of those slots.

3. Services covered by the charge

The services to be provided by RFI, as manager of the national rail infrastructure, to railway operators which make use of the infrastructure in return for the payment of access charges are as follows:

- a) Allocation of capacity and advance timetabling.
- b) Access to tracks and facilities.
- c) Provision of an adequate period of standing time near to facilities, as specified in the conditions of contract.
- d) Use of the track and electrical traction power supply system.
- e) Management of traffic movements within the opening hours of facilities made public by the infrastructure manager.
- f) Basic information.
- g) Supply of traction electricity.

With reference to the above services:

- a) The Network Prospectus states that standing times are unlimited: all standing times are therefore covered by the charge, regardless of their duration.
- b) The opening hours for lines and facilities are specified in the Network Prospectus published annually by RFI.
- c) The basic information is provided in Technical Annex No. 6 to Ministerial Decree 43T/2000.

4. Infrastructure management costs covered by the charge

The infrastructure usage charge does not cover all the costs of infrastructure management; in fact, it is designed to compensate solely for costs arising directly from train movements (cost of staff and operatives; share of direct and indirect overheads relating to traffic movements), and the cost of the electrical traction power supplied to railway operators.

The access charge is therefore not designed to cover ordinary and extraordinary maintenance costs, and consequently the cost of work to maintain network efficiency (which is covered by public subsidy under the Contract Programme), nor does it cover investment and depreciation costs.

In the balance sheet for infrastructure management, revenue from access charges covers about a third of routine maintenance costs (*i.e.* excluding the costs of renewals as well as investments).

5. “Charge amount”

Every slot has its own price for which the corresponding charge is calculated on the basis of the parameters specified in Presidential Decree 277/98 by means of the algorithm given in Ministerial Decree 43T/2000.

Every railway operator pays RFI the relevant charge for each train path it utilises.

The sum of the charges relating to all paths used during the calendar year by all railway operators, and paid by the latter to RFI, is referred to as the “charge amount” and corresponds to the total return for the infrastructure manager with regard to usage charges.

The “charge amount” is equivalent to the costs specified in the previous paragraph with regard to the entire managed network. In drawing up Ministerial Decree 43T/2000, the authorities considered the equivalence between revenue from charges and train movement costs solely at the national level, and not with reference to portions of network or individual lines.

This means that the charge for each train path is calculated on the basis of the characteristics of the path and the lines utilised, but does not necessarily cover the full traffic management costs relating specifically to those lines (principle of “Network Solidarity”). In fact, had the decision been taken to match the revenue from charges from each line to the relative specific costs of individual train movements, the resulting charges over a large part of the national rail network would be so high that they would price rail services out of the market.

6. Criteria for determining the usage charge

The user charge for each train path (“C”) is the sum of three parameters, whose significance and method of calculation will be explained later in this document:

$$("C") = ("A") + ("B") + ("E");$$

where: (“A”) is the track section/node portion, equivalent to an area tariff, which accounts for about 40% of the charge amount, excluding electrical power;

(“B”) is the km/minute portion, equivalent to a consumer tariff, which accounts for 60% of the charge amount, excluding electrical power;

(“E”) is the portion covering the cost of traction power, which is paid solely for trains requiring such power.

7. Track section/node portion

From the standpoint of area tariffs, the national network (approximately 16 000 km) has been sub-divided, according to the quality of the infrastructure, into 50 tariff areas:

- 8 nodal sections, amounting to around 700 km, each treated as an individual tariff area.
- 39 commercial track sections (core network) amounting to around 5 500 km; each section is treated as an individual tariff area.
- Secondary network, amounting to around 7 300 km and treated as a single tariff area.
- Lightly trafficked network, amounting to around 2 500 km and treated as a single tariff area.
- Shuttle service lines, amounting to around 250 km and treated as a special category within the secondary network.

A price is assigned to each tariff area and entitles operators to cross area without any restriction on the length of the movement. Prices are listed in Table D.1.

The section/node portion of the charge (“A”) for each train path corresponds to the sum of the prices of each area crossed. The value of the reservation charge is based on this portion of the access charge, whose relation to the distance travelled is highly regressive and whose purpose is to partly offset, for short paths, the share of residual unused capacity.

Example

On the Rome-Pisa-Genoa line, a train path limited to the trip between Rome and Civitavecchia will make at least some of the capacity in the subsequent stage unusable, since a Civitavecchia to Pisa path has no market value. Accordingly, the payment for the section/node share of the Maccarese-Pisa section from the Rome-Civitavecchia part will partially compensate for rendering the subsequent stage unusable.

In the lightly trafficked network, where the available capacity far exceeds demand and the impact of unused capacity on partial trips are of no significance, the section/node portion is not paid.

On shuttle service lines, where the return train is associated with the outbound train without reference to other trains, the section/node portion is divided between the two trains and levied at a rate of 50%.

The prices resulting from application of the section/node portion are lower, on a distance (km) basis, for paths that make use of the secondary network, and slightly higher for long-distance paths or paths that make use solely of tracks sections in the core network or nodes. Ultimately, such paths help to balance demand, which at present is highly concentrated, within the network system. They are primarily used for services, such as freight consignments and night passenger trains that are not tied to specific routes.

8. Km/minute portion

From a consumer tariff standpoint, the km/minute portion is paid on all parts of the network, based on the number of minutes spent in nodes, where capacity is the most expensive and highly dependent on crossing times and on kilometres travelled in the rest of the network.

The price is always set at a fixed charge of 1.00 euro/km on the secondary and lightly trafficked networks.

The price on the core commercial network, starting again from a basis of 1.00 euro/km, is differentiated through increases that are a function of three significant parameters:

- Traffic density or degree of line saturation, differentiated according to the time of day (no differentiation is made between the days of the week or season).
- Infrastructure wear attributable to the train (according to its weight and speed).
- Difference between the commercial speed in the section in question and a “standard” speed or speed that affords optimum use of the line.

Example

On a track section to which a “standard” speed of 80 km/h applies, the insertion of a 120 km/h (or in the same way 40 km/h) section would make more than one 80 km/h section unusable, because of the rigid rules applicable to traffic movements on the railways. In this case, the higher price of the km/minute part of the tariff applied to the 120 km/h (or 40 km/h) section compared to the “standard” speed section partly offsets the revenue foregone from the sections that are made unusable.

Prices for the nodal sections start from a 1.00 €/km base-rate and increase as a function of two significant parameters:

- Traffic density according to time band (demand).
- Use of main terminal stations (as a function of demand and the capacity used on each track section).

Example

In a terminal station, a reversible train must stop for at least 10 minutes in order to change its direction of travel, while the equivalent time spent standing in a through station is of the order of 3 to 4 minutes; the greater use made of station track restricts system capacity and thereby reduces earnings, which loss is partly offset by the higher access charge.

In the case of both the core network and the nodal sections, the structure of the km/minute portion is such that prices increase where capacity is most in demand, and where the characteristics of the sections requested render a greater number of other sections unusable. They decrease where the opposite is true.

In conclusion, to the extent that it affects total transport costs, the infrastructure usage charge is designed to promote the use of alternative routes and time bands, promoting routes on the core network and nodal sections that have lower traffic densities, thereby rebalancing demand both across lines and times of the day and ensuring that the network is used to better effect.

9. Traction electricity charge

The unit price for power is 0.332 €/km, applied indiscriminately to all sections on which provision is made for electrical traction.

10. Reservation charge

This charge is set equal to the section/node portion of the usage charge (“A” in section 6 above), but capped so that it does not exceed 50% of the total usage charge.

In the lightly trafficked network this charge is therefore equal to zero, since the availability of surplus capacity with regard to the capacity needed to meet demand makes a reservation charge superfluous.

In other situations it can vary from 20% (long-distance track sections) to 50% (short-distance track sections) of the charge.

11. Some statistics

Calculating the km/min portion in the core network and nodes by means of the equations given in Ministerial Decree 43T/2000 is a lengthy process. RFI has therefore provided direct access to a calculator on its Internet site www.rfi.it, (“*Conoscere l'Offerta*”), which can be used to rapidly calculate access charges.

Table D.2 gives a number of examples of unit values for various types of network usage according to train characteristics, the high degree of differentiation in different situations is evident.

The following examples provide further indications of the degree to which prices vary.

Example.

Access to a train path of standard speed and track wear characteristics costs 0.77 €/km on low traffic density lines, 1.00 €/km, on medium-density lines and 1.17 €/km on high-density lines.

Access to a train path of standard speed with low track wear characteristics on low traffic density lines costs 0.67 €/km, and with high wear characteristics and high density traffic costs 2.00 €/km.

Access to a train path of standard speed with low track wear characteristics on a medium-density line costs 0.90 €/km, but on the same line at a speed far above standard speed and with a high rate of wear costs 3.17 €/km.

Table D.1. Value of the section/node portion according to tariff area

Typology of sections/nodes (typology of tariff areas)	Price (euro)
NODES	51.65
CORE – Double track sections – 250 km/h	64.56
CORE – Double track sections – 200 km/h	56.81
CORE – Other double track sections	54.23
CORE – Single track lines	49.06
SECONDARY NETWORK (single tariff area)	46.48
Lightly trafficked lines	0.00
Shuttle service lines	1

1. The section/node portion of the access charge for shuttle lines is 50% of the charge payable on the basis of track section characteristics.

Table D.2. Unit value (€/km) of the km/min portion on the core network according to track characteristics

Speed	Wear			
	D.2a – Low density lines			
	0%-80%	80%-120%	120%-200%	200%-above
0%-20%	0.67	0.77	1.02	1.60
20%-50%	0.75	0.85	1.10	1.68
50%-100%	1.33	1.43	1.68	2.27
100%-above	2.00	2.10	2.35	2.93
D.2b – Medium density lines				
0%-20%	0.90	1.00	1.25	1.83
20%-50%	0.98	1.08	1.33	1.92
50%-100%	1.57	1.67	1.92	2.50
100%-above	2.23	2.33	2.58	3.17
D.2c – High density lines				
0%-20%	1.07	1.17	1.42	2.00
20%-50%	1.15	1.25	1.50	2.08
50%-100%	1.73	1.83	2.08	2.67
100%-above	2.40	2.50	2.75	3.33

Notes: “speed” parameter: the percentage difference is calculated in respect of the standard speed specified in Technical Annex No. 8 to Ministerial Decree 43T/2000; “wear” parameter: wear is calculated in respect of the level specified for an average train in Technical Annex No. 12 to Ministerial Decree 43T/2000.

Table D.3. Unit value (€/km) of the km/min portion in nodal sections

Time band	Use of main station	
	NO	YES
3 (peak) 6.00 – 9.00	1.30	5.20
2 (medium) 9.00 – 22.00	1.00	4.00
1 (low) 22.00 – 6.00	0.80	3.20

Figures: Summary of charges

Figure D.1.

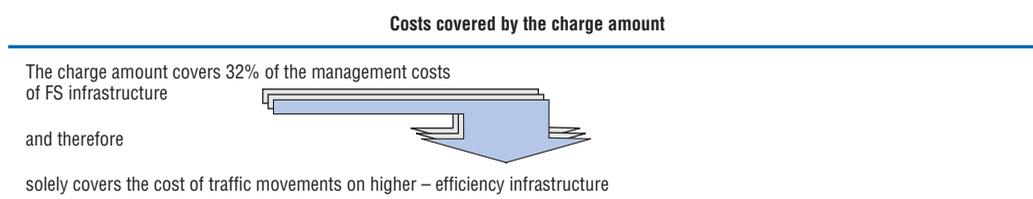


Figure D.2.

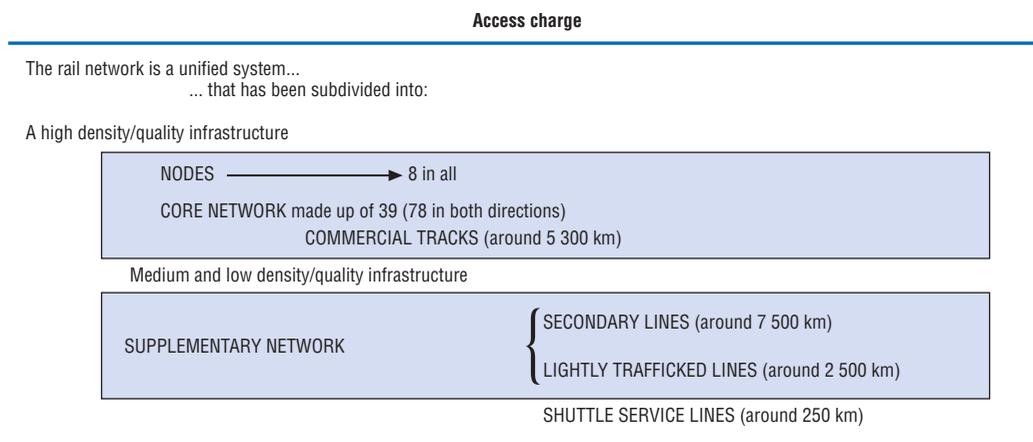


Figure D.3.

Network breakdown

The network has been broken down into 8 nodes and 39 commercial track sections, as well as a secondary network



Figure D.4.

Access charge

The access charge is based on line characteristics, traffic density and type of train (and not on the cost of individual portions of the network under the principle of "network solidarity")

Track sections for which demand is high partly subsidise lines for which there is less demand

Figure D.5.

Breakdown of the charge amount

The charge amount is the sum of two elements:

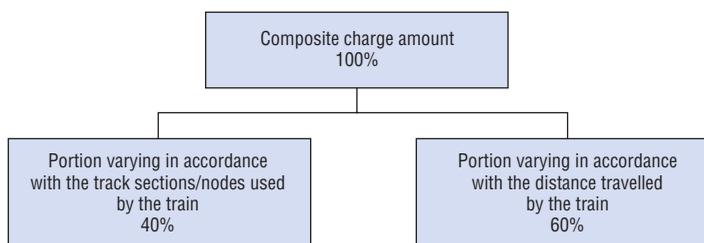


Figure D.6.

Track section/node portion

Eight categories of unit price for track sections/nodes have been established in accordance with the criteria set out in Presidential Decree 277/98, Articles 7.3 and 7.3.b.



	Characteristics	Price (lire)	Price (euro)
	NODES	100	0.05
Core network	Double track Max. speed 250	125	0.06
	Double track Max. speed 200	110	0.06
	Conventional double-track lines/Underground	105	0.05
	Single-track lines	95	0.05
Supplementary network	SECONDARY NETWORK	90	0.05
	Lines with light traffic	–	–
	Shuttle services lines	*	*

The reservation charge for scheduled paths (Art. 7/4 of Presidential Decree 277/1998) is based on the value of the track section/node portion.

Figure D.7.

Distance-based portion

Payable throughout the rail network

depending on:

- degree of line saturation;
- wear and tear;
- train speed.

The basic price of 1,936.27 lire (1 euro) per kilometre applies to all trains on the supplementary network and to trains in the core network:

- running on medium-density commercial track sections;
- producing line wear equivalent to that caused by an “average train”;
- operating at a speed comparable to the standard reference speed for the line.

THE PRICE PER KILOMETRE IS HIGHER:

- on lines close to saturation point;
- for trains causing major wear on infrastructure;
- for trains whose speed deviates from standard;

... but is LOWER in the opposite case.

Figure D.8.

Time-based portion

Paid by all train travelling within the boundaries of the 8 nodes

The basic price of 1,936.27 lire (1 euro) per minute applies to trains that:

- operate during medium usage hours of the days;
- use non critical node plant and equipment (where alternatives all exist).

The price per minute increases:

- during peak hours;
- if the main station is used;

... but DECREASES in the opposite case.

Figure D.9.

Determining the variable portion of the line

Unit prices (€/km) are listed below:

P3 = Wear P1 = Speed		LP2 = Low saturation (above 50%)				P3 = Wear P1 = Speed		P2 = Medium saturation (50%-75%)			
		0%-80%	80%-120%	120%-200%	200% - above			0%-80%	80%-120%	120%-200%	200% - above
0%-20%		0.67	0.77	1.02	1.60	0%-20%		0.90	1.00	1.25	1.83
20%-50%		0.75	0.85	1.10	1.68	20%-50%		0.98	1.08	1.33	1.92
50%-100%		1.33	1.43	1.68	2.27	50%-100%		1.57	1.67	1.92	2.50
100% - above		2.00	2.10	2.35	2.93	100% - above		2.23	2.33	2.58	3.17

P3 = Wear P1 = Speed		P2 = High saturation (above 50%)			
		0%-80%	80%-120%	120%-200%	200% - above
0%-20%		0.7	0.8	1.0	1.6
20%-50%		0.8	0.9	1.1	1.7
50%-100%		1.3	1.4	1.7	2.3
100% - above		2.0	2.1	2.4	2.9

Basic price value

Figure D.10.

Determination of the variable portion of the node

The node usage price is adjusted according to two variables:

- time band;
- use of the main station (departure, stop, arrival).

Unit prices for use of the node (€/minute) are shown in the table below:

Use of main station	
No	Yes
1.30	5.20
1.00	4.00
0.80	3.20

Basic price value

ANNEX E

*The new framework for access
to railway infrastructure in the EU:
Ensuring non-discrimination and high quality
international rail services¹*

by

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Why harmonise access conditions?

Fifteen March 2003 was an important day for the European railway sector. From that date onwards railway undertakings with the necessary licence have access to the Trans-European Rail Freight Network (TERFN) when they operate international rail freight services in the EU and soon also in accession countries. This access right will be valid for a network of ca. 50 000 km (out of a total European network of 150 000 km), including terminals and ports with feeder lines of 50 km in length or 20% of the total journey length at either end of the journey. From then on, open access freight services across one or more networks will become possible, provided that all the issues relating to the technical feasibility of such a journey have been resolved, for instance by using a locomotive capable of operating under the various electricity and signalling systems and provided that the railway undertaking has obtained the necessary safety certificates.

However, right of access alone does not guarantee that a railway undertaking wishing to operate on foreign rail infrastructure will be able to compete with the incumbent undertakings on a level playing field. Will it be sure of obtaining the train path that it needs to satisfy the expectations of the customer? Will it have to pay the same infrastructure charge as the incumbent for the same use? Will it have nondiscriminatory access to essential service facilities, for instance, for refuelling or repairs? It is precisely with a view to ensuring non-discriminatory treatment of all railway undertakings that Directive 2001/14 lays down common rules and principles governing conditions of access to the network.

A central condition for non-discrimination is that all essential functions such as the allocation of infrastructure capacity and the setting of track access charges should be carried out by an infrastructure manager or another body which does not operate rail transport services.³ Otherwise, a conflict of economic interests would be unavoidable, a situation which would be detrimental to competing railway undertakings. Member States have a certain degree of freedom in how they implement this provision of the Rail Infrastructure Package Directives. But whatever the solution adopted, they have to prove that this obligation is actually being met in respect of both the legal safeguards taken and the experience of day-to-day operations.

The Network Statement: starting point for the provision of rail services

At regular intervals rail infrastructure managers will be required to publish a Network Statement. This is a central document designed to ensure that the opening up of the market is a success when it happens from 15 March next year. The Network Statement should contain all the information that a railway undertaking requires to prepare a business case for a new rail service: a technical description of the infrastructure, the infrastructure charging principles together with tariffs for the different services, and the principles, criteria and procedures for the allocation of train paths including transparent provisions for *ad hoc* capacity requests. It is also vital that the infrastructure managers

include in the document all future changes in the access conditions as far as they are known to them, to enable the railway companies to plan their services efficiently.

A few infrastructure managers have already made some information available in one form or another – information that will have to be published in the Network Statement. Such information is for instance available in Sweden, France, Italy, the Netherlands, the UK and Germany. As things stand at present however the network statement information presented is far from complete and not yet consistent either. The infrastructure managers of the UIC have set up a working group in order to design a common template for the Network Statements including a common document format and structure. The Group is also planning to include information in the Network Statement on the legal relationship between the infrastructure managers and the railway undertakings, for example the framework agreement and the track access contract.⁴ The infrastructure managers intend to publish their Network Statements but also all relevant information from other infrastructure owners on their Internet web sites. A formal agreement among infrastructure managers on the format of the network statement is sought for autumn 2002.

In order for railway undertakings to be able to take full advantage of the new regulatory framework for international rail freight services on 15 March 2003, the information should, in principle, be available well ahead of this date. As the Directive does not lay down any provisions for the interim period, the European Commission has asked Member States to ensure that a first “core” Network Statement for the 2003 timetable period be already published in autumn 2002.

Rail infrastructure charging

Track access charges can represent up to 30 or 35% of the total production cost of rail freight services. They are therefore an important item in the competitiveness of railway undertakings. The design of the charging scheme is crucial both for efficient use of the infrastructure and for ensuring fair and non-discriminatory access to the network. Track access pricing cannot be left to the market, since in Europe at least there are no functioning markets for the provision of rail infrastructure. In fact, most Monopoly suppliers have a natural tendency to set prices too high. In rail that would mean fewer trains using the tracks than is economically justifiable. In order to ensure that the monopolist does not abuse his monopolistic position and to provide him with clear signals as to how to develop the network to accommodate demand for capacity, public authorities have to regulate infrastructure charging to ensure an efficient use of the infrastructure. Public authorities also have to make sure that the design of the charging scheme does not implicitly discriminate against certain groups of railway undertakings, for instance smaller ones or newcomers.

An economically efficient infrastructure charging rule is to adopt social marginal cost pricing. This means that the users of the infrastructure should be charged that share of the total infrastructure cost which their individual train causes to the system including the external cost to society (for instance, the air pollution caused by diesel emissions or the annoyance of the noise emissions of a passing train). The objective is to ensure socially optimal use of the infrastructure. The provisions on charging in Directive 2001/14 reflect these recommendations of economic theory. Marginal cost pricing is mandatory,⁵ charging for external environmental costs however is left to the discretion of member States.

The major purpose of the charging provisions is to ensure transparency of the structure and basic principles of rail infrastructure charging schemes. They address issues such as the possibility of recovering a higher share than just the marginal infrastructure costs (through so-called mark-ups) or the costs of investment projects, as well as charging to reflect the relative lack of availability of certain segments of the infrastructure during times of congestion. However, they do not prescribe in detail the rules and methodologies for establishing the various charging elements. This leaves member States a margin of freedom with regard to implementation. The process of political negotiation is one reason why Directive 2001/14 is not more specific on the charging scheme. Member States could simply not agree on any further steps towards harmonisation as they have quite different points of view on how the railway infrastructure should be financed in their countries.

The European Commission is aware of the risk of member States implementing the charging provisions in a divergent way. This would indeed jeopardize the efficiency and competitiveness of international rail freight services in relation to other modes such as road haulage. There are already very strong variations in the level of total infrastructure charges per train-km in Europe, which currently diverge by a factor of about 1 to 7. If there were also considerable structural differences in the parameters of the schemes, it would be very difficult to provide rapid quotations for an infrastructure charge for an international train path. The Commission has thus tried to introduce maximum cohesion in the implementation process by initiating in-depth discussions and exchanges with member States to ensure best practice in this respect at the level of the regulatory Committee whose role it is to accompany the implementation of Directive 2001/14. If the low level of harmonisation on infrastructure charging turns out to be a barrier to the overall development of the internal market for rail services, the Commission will have to consider further legislative initiatives.

A number of member States have been actively setting up or preparing infrastructure charging schemes. On the basis of experiences in Austria, Germany, France, Italy, Portugal, Finland, Sweden and the UK, the regulatory Committee's work has concluded that it is possible to calculate the marginal cost of infrastructure use and to implement this approach at a practical level. However, each country arrives at very different figures for marginal costs. Due to differences in scope, definitions, unit costs, what is included in the costs and how the maintenance budget is calculated, the marginal cost figures can vary by a factor of 1 to 20. Some of the differences are certainly justified, since the unit costs of production factors such as labour differ from country to country. However, a great deal of divergence is created by differences in methodology. Further harmonisation of the underlying methodology may thus prove desirable.

The Infrastructure Package Directives allow infrastructure managers a degree of management freedom. They encourage them to use market instruments such as infrastructure pricing to pursue a proactive, business-oriented approach (as opposed to merely administering the rail infrastructure) in order to attract rail traffic to their infrastructure. However, rail infrastructure managers currently face a real dilemma. Their room for manoeuvre in pursuing such an approach is very limited. In fact, national governments frequently change their support policy towards infrastructure managers according to the prevailing state of public finances in the country. The absence of a stable financial framework within which infrastructure managers can ensure efficient use of the network and attempt to meet future demand from railway undertakings appears to be a real problem. The Commission may have to actively encourage member States to provide a stable financial framework for

their infrastructure managers, for instance by concluding contractual agreements between the state and infrastructure managers according to Art. 6(3) of Directive 2001/14.

Non-discriminatory access to service facilities

When a railway undertaking performs rail transport services it requires access to a range of services and the use of appropriate facilities such as catenaries, refueling facilities, freight terminals and maintenance facilities. Many of these facilities and services are owned and/or operated by railway undertakings. These undertakings may not always welcome competitors who wish to use their facilities, in particular when these services are already heavily or fully used, nor have any reason to allow their use at a reasonable price, due to a possible quasi-monopolistic position. Without the right of non-discriminatory access to facilities and services the rights of network access created by Directive 91/440 and 2001/12 would lose much of their value. Articles 5 and 7 of Directive 2001/14 therefore define the access conditions and the charging requirements for services. These provisions identify four types of constituents: track access, use of the service facility, supply of the service at the facility and the purchase of consumables. For all these constituents more or less stringent rules have been established, aimed at striking a balance between the protection of the railway undertaking wishing to have access to the facilities under fair conditions and the interests of the owner of the facility in guaranteeing the viability of the facility operation. In any case, the regulatory bodies to be set up in each Member State should ensure non-discriminatory access conditions to these services with a fair charge that does not distort competition.

Future experience will show whether there is a need for structural separation of facilities and the provision of services from railway undertakings in order to ensure non-discriminatory access. Once “open access” traffic picks up, another important question will be whether more precise rules are required to govern the charges levied for the use of facilities and services as well as to regulate the allocation of time periods for using facilities.

The allocation of rail infrastructure capacity

One of the basic ingredients of a competitive rail service is a good quality train path. The regulatory framework must therefore ensure that any potential discrimination against railway undertakings trying to obtain such a train path is reduced to a minimum. The allocation process and its underlying principles must be transparent and fair. They should take into account the interests of all parties involved in a balanced way. In practical terms it should not therefore be possible to refuse a capacity request on the grounds that there is no more capacity available because the incumbent railway has reserved all the interesting train paths. The provisions in Directive 2001/14 abolish so-called grandfather rights, since a train path will be granted to applicants for a maximum duration of one timetable period only.

However, a railway undertaking investing in a service for a number of years, for instance in public service passenger transport, may enter into a framework agreement with the infrastructure manager in order to be guaranteed a certain amount of capacity so as to be able to carry out the service for more than one timetable period. Framework agreements do not specify a train path in detail but reserve a certain amount of capacity in a more generic manner, in a bid to meet the legitimate commercial needs of the applicant. In principle, such framework agreements should be for a period of 5 years with a possible extension in specific

cases where it is justified by commercial contracts or specialised investments. Framework agreements can never be exclusive with regard to other legitimate users of the railway infrastructure.

In this area a high degree of transparency is required to ensure non-discrimination in the relationship between railway undertakings and rail infrastructure managers. One way of achieving this is to have transparent legal relationships, for instance, having recourse to standard legal texts that can be adapted to the specific needs of the parties but whose basic features do not contain any “surprises”. The UIC Legal Group is currently preparing a text for a standard framework agreement and a standard track access contract.⁶ The European Commission planned to discuss the issue of standard track access contracts with all interested parties at a workshop at the end of 2002.

A basic feature of the new capacity allocation process is that, in principle, international train paths are determined before national train paths are allocated.⁷ This should encourage the development of international services. At the moment, the train paths for international services are of lower quality. In order to promote the enhancement of international rail freight services, which is one particular priority of European transport policy, precedence will now be given to the allocation of international paths.

However, the quality of international rail (freight) services also depends on other factors such as the so-called priority criteria used for the allocation of capacity. The present practice is that passenger services usually receive a higher priority in the allocation of train paths and in daily traffic management. This obviously has a rather negative impact on the performance of rail freight services. The conditions under which such priority criteria may be used in the future are rather strict. Directive 2001/14 stipulates that they may be applied only if a specific infrastructure has been declared congested. In such a situation, the infrastructure manager has to carry out a capacity analysis and then develop a capacity enhancement plan aimed at eliminating the infrastructure congestion. Hence, priority criteria may not be applied eternally.

Furthermore, passenger services cannot be favoured *a priori* without any analytical underpinning, since account must be taken of the importance of a service to society. The importance of freight services and in particular international freight services must therefore be given adequate consideration. However, today's practice shows that priority criteria applied in EU Member States vary widely from country to country. If this diversity were to subsist in the future, it would be a tough challenge to establish good quality international train paths, especially for freight, as the service could face different priorities on the various national networks. It would thus seem to be desirable to establish greater consistency in these rules at European level. It is equally important that the priority criteria should be non-discriminatory and not favour any particular type or size of railway undertaking.

So far, Directive 2001/14 has proved to be a flexible, ongoing document, capable of catering to the needs of the different market players. At the request of rail infrastructure managers, the European Commission presented a proposal to the regulatory Committee, which supervises the implementation process, that Annex III be amended, before even the Directive has been transposed into national law. On 2 July 2002, the Committee gave a positive opinion with regard to changing the date of the international timetable changeover, which used to take place on the last Saturday in May. Now it has been changed

to the second Saturday in December. This amendment will become effective once this decision by the European Commission has been published.

The international co-operation of rail infrastructure managers

Rail infrastructure managers will have to play an important part in ensuring that the market for international rail freight services operates smoothly after 15 March 2003. As they are responsible for a number of essential functions in the rail market their cooperation is vital to facilitate international traffic. For example, they should cooperate in the area of infrastructure charging and in the field of the international allocation of train paths to achieve efficient operation of train services crossing more than one rail network.

In this area, the European Commission has left the initiative to the railway sector. For instance, the UIC has set up a platform in which infrastructure managers from integrated railway undertakings as well as independent ones are setting up a system of commercial co-operation under the name of "Rail Net Europe". The aim of this common structure is to make it easier for railway undertakings to provide international services by making available one-stop-shop (OSS) facilities. This effectively means that a customer could approach one of the European infrastructure managers in order to request an international train path and to ask for a price quotation. The idea is that the infrastructure manager uses the joint support structure of Rail Net Europe to construct the international train path and comes back to the customer with a price quotation for the use of the whole path in co-operation with the other infrastructure managers. This task is quite a tall order for the infrastructure managers, as for instance the structurally very different national infrastructure charging schemes render a swift and reliable price quotation for the whole journey difficult. In addition, a corridor manager will keep a close watch on how the rail service operates, monitor quality and function as a trouble-shooter on the routes for which he is responsible. It is expected that the rail infrastructure managers will formally agree on their co-operation platform this year in the autumn.

International train path planning and international timetable co-ordination by infrastructure managers in Europe is currently carried out by Forum Train Europe (FTE). FTE, which was set up in 1997, is a framework organisation without a legal status whose members are infrastructure managers and railway undertakings from about 35 European countries – from Portugal to Russia and from Turkey to Scandinavia.

A railway undertaking can order an international train path from one infrastructure manager who passes on this request to FTE for planning and co-ordination. The process consists of a yearly cycle of four planning phases and three conferences. After the co-ordination process, the international train path is however not allocated at European level but by the respective national infrastructure managers. In order to be able to propose high quality products to their customers, infrastructure managers tend to develop pre-constructed catalogue paths for freight traffic on important international corridors. These catalogue paths are directly agreed among the infrastructure managers at their own commercial risk.

The co-operation of infrastructure managers at FTE level still has to be improved in at least two respects, namely efficiency and transparency. Simplification and acceleration of the entire co-ordination process should enable the infrastructure managers to provide information and decisions more rapidly in response to customer requests. Currently the whole complex process is carried out manually without computer assistance. Thus, modern software based tools should be introduced to ensure an efficient co-ordination process. Commercial

co-ordination of services to be performed by railway undertakings in FTE prior to the official co-ordination cycles (Route Management) should not lead to *de facto* pre-emptive reservation of international train paths. The fact that some infrastructure managers form an integral part of national railway undertakings could create a collusive situation. It poses the risk that the requests of independent railway undertakings might not receive fair treatment. Transparency and a separation of functions between infrastructure managers and rail service providers are therefore vital to ensure non-discrimination.

There is an urgent need for infrastructure managers to co-operate internationally in order to ensure smooth functioning of the institutional framework for international rail freight services from 15 March 2003 onwards. The European Commission has appealed to member States to ensure that their infrastructure managers present their final co-operation framework jointly in autumn 2002. Where necessary the national regulatory bodies should work together in order to ensure that infrastructure managers co-operate efficiently.

Regulatory bodies

The infrastructure package also introduced the concept of a regulatory body. The aim is to offer railway undertakings a safeguard against any anti-competitive practices that might constitute a barrier to entering the railway market. Another objective is to monitor competition in the railway market and take appropriate action to correct any undesirable developments in those markets.

A regulatory body should be independent of market operators like infrastructure managers and railway undertakings. Railway undertakings should be able to appeal against any decision regarding entry to the railway market. The directive explicitly mentions decisions regarding the network statement, allocation of capacity, infrastructure charging and safety certification. In such cases, the regulatory body should assess whether the decisions taken are non-discriminatory and in line with national and EU railway legislation. The regulatory body should investigate any appeals and after having received all the relevant information take a decision within 2 months. The infrastructure managers or any third parties involved must provide this information without delay. The decisions of the regulatory body are binding but are subject to judicial review.

The regulatory body does not only act in response to railway undertakings that requested its intervention by lodging an appeal. It should also play a pro-active role in order to solve market entry barriers and ensure non-discriminatory access. Besides handling specific cases the regulatory body should monitor the development of the whole railway market and in particular international rail freight services.

Regulatory bodies are already in place in Great Britain, Germany, Austria, and Portugal. However, not all of them have been invested with all the necessary powers to fulfill the requirements of the infrastructure package. Other member States will follow shortly. It is clear that the regulatory bodies should have sufficient administrative capacity to deal with charging and allocation issues, competition policy and railway safety issues. Regulatory bodies should also co-operate at EU level in order to facilitate international railway services.

Conclusions and prospects

The set of rules, principles and institutional arrangements proposed by Directive 2001/14 is an initial approach, aimed at defining transparent conditions for use of the infrastructure

by railway undertakings. The harmonisation of these rules will favour the provision of international rail services and contribute to the optimisation of infrastructure use. This constitutes the cornerstone of the strategy to modernise the regulatory framework for rail services in the EU. It lays the foundations for modern business strategies aimed at improving the competitiveness of the rail sector. It is thus important that all provisions of the Infrastructure Package Directives be implemented swiftly and consistently. The utmost care should be taken to ensure transparency of procedures and avoid any conflicts of interest in the institutional set-ups. Member States together with their infrastructure managers will have to carry the major brunt of this task in the coming months.

However, the regulatory framework has not yet been fully developed. The Rail Market Monitoring Scheme, designed to analyse and monitor developments in the rail market, will assess how the framework functions. If need be, the Commission may put forward further proposals on the basis of experience gained from March 2003 onwards. Already today we can identify a number of areas where an extension of the regulatory framework might be considered.

Under present EU rules, applications for rail infrastructure capacity can only be made by railway undertakings except in countries like Sweden where national legislation allows a broader group of “authorised applicants”. If the opening up of the market does not lead to an improvement in the quality of international rail freight services, this would plead in favour of strengthening the role of customers vis à vis railway undertakings by giving them the opportunity to have a more direct influence on the choice of the train path.

The implementation of infrastructure charging rules may lead to very diverse charging structures in member States. This would have an adverse effect on the competitiveness and the organisation of international rail (freight) services. Further harmonisation, for instance, of the methodologies used for calculating infrastructure cost elements might thus be desirable.

The work on a methodology for a Community Framework Directive on transport infrastructure charging, which is currently being carried out by the Commission, may result in certain elements of rail infrastructure charging such as costing for the environmental impacts becoming mandatory in line with future obligations in other transport sectors. This would be implemented through sectorial rail charging directives or amendments of existing ones, such as Directive 2001/14/EC, which the Commission intends to present at a later stage.

Notes

1. The paper was first published in the October 2002 edition of Rail International.
2. The author takes sole responsibility for the views expressed.
3. See Art. 6(3) of Directive 2001/12 and Art. 4(2) and 14(2) of Directive 2001/14.
4. Foreseen respectively in Art. 17 of Directive 2001/14 and Art. 10(5) of Directive 2001/12.
5. The reader will not find the term marginal cost in Directive 2001/14 which has been avoided intentionally for pedagogical reasons. Art. 7 (3) refers to “... charges... shall be set at the cost that is directly incurred as the result of operating the train service.”
6. Foreseen respectively in Art. 17 of Directive 2001/14 and Art. 10(5) of Directive 2001/12.
7. Annex III of Directive 2001/14, paragraph 4.

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