A Comparison of Overseas Railway Systems: Their Policy Trends and Performance

Information Paper

During the last decade, the major railway systems around the world have undergone a fundamental reappraisal of their place in the economy in general, and their transport purpose, in particular. This Paper examines the railway systems of eight countries, including Australia, to see how they responded to a changing competitive environment, focusing on institutional and organisational restructuring that had taken place to revitalise them and to improve their performance.

Subject
Series
Date
A to Z
Search
Results
Print
Exit
GO BACK

Information Paper 30

A Comparison of Overseas Railway Systems: Their Policy Trends and Performance

AUSTRALIAN GOVERNMENT PUBLISHING SERVICE, CANBERRA

ISSN 0158-104X
ISBN 0 644 08710 2

Printed in Australia by Union Offset Co. Pty Ltd, Canberra

ABSTRACT

During the last decade, the major railway systems around the world have undergone a fundamental reappraisal of their place in the economy in general, and their transport purpose, in particular. This Paper examines the railway systems of eight countries, including Australia, to see how they responded to a changing competitive environment, focusing on institutional and organisational restructuring that had taken place to revitalise them and to improve their performance. The Paper describes the railways' institutional settings, the sizes and tasks performed and the main technological developments undertaken. The railways' performance characteristics are presented in terms of a small number of financial and operational indicators. The Paper concludes that railways continue to occupy a significant place in the economy, and that governments see that their preservation is in the public interest. Importantly, however, their image is being transformed from institutions to commercial enterprises, a change which is becoming more evident in Australia.

FOREWORD

In a rapidly changing transport environment in the 1980s, non-urban railways around the world responded with substantial restructuring in a bid to become more responsive to the marketplace and to improve performance. Australian government railways, faced with mounting deficits, have similarly made concerted efforts to rationalise and reorganise their operations. The nationally formed Railway Industry Council is presently engaged in developing a national strategy for revitalising the railways.

In this setting, this Paper, on a comparison of Australian and overseas railway systems, is timely. Its theme centres on the institutional and organisational reforms that have taken place among the world's railways, and on trends in the railways' performance. The work was initiated by Mr C. Cronin and conducted by Messrs M. Kunz and M. Shiel. Mr T. Mikosza finalised the preparation of this Paper.

Dr M. Taylor
Research Manager

Bureau of Transport and Communications Economics
Canberra
October 1988

CONTENTS

TABLES

SUMMARY

During the last decade, the major railway systems around the world have undergone a fundamental reappraisal of their place in the national economy in general, and their transport purpose, in particular. This Paper sets out to examine the railway systems of eight countries to see how they responded to the changing transport competitive environment, focusing on the institutional and organisational restructuring that had taken place to revitalise them and to improve their performance.

The railways selected for this study are the non-urban public operations of the privately-owned and government railways of the United States of America, Canada, the United Kingdom, France, the Federal Republic of Germany, Japan, New Zealand and Australia. Discussion opens on the importance of the railways, and of transport in general, to each economy. The Paper then describes the railways' institutional settings, system sizes and tasks performed since 1980 and explores the main technological developments. The railways' performance characteristics are presented in terms of a small number of financial and operational indicators for which consistent information can be drawn together.

The study has shown that, while railways play a less dominant transport role than in the past, they nevertheless hold a significant place in the economy. Governments clearly see that preservation of railways is in the public interest, not so much as institutions but rather as successful government business enterprises or privately-owned undertakings. A number of common threats are evident in the recent overseas railways restructuring and reorganisation. Changes in the railway industry have generally addressed the four interrelated objectives of rationalisation, commercialisation, more flexible management and transparent accounting. The process of change is now evident in the Australian railway systems, which are well placed to benefit from the overseas experience.

CHAPTER 1 INTRODUCTION

BACKGROUND

In many developed countries, the history of land-based transport is essentially a progression from public railway monopolies to the predominance of a private road transport industry. The degree of competition between the two modes has been as much determined by government regulations, as by advances in road transport technology and infrastructure (for example, see Blanchette 1987; Heinisch 1986).

Almost from the outset, railways quickly became economic, political and strategic tools, especially in Australia and New Zealand. At first inefficient curiosities, their potential for aiding industrial development and linking remote areas to domestic markets and to ports for export of agricultural and mineral products, soon became apparent. For example, in Australia in the last century, the carriage of wheat by dray to the port from 50 kilometres inland was often more expensive than the imports of the same commodity from the west coast of America. Once the railways enabled wheat to be grown far from the coast, Australia became a significant supplier of wheat to European markets. Indeed, according to Blainey (1966), most of Australia's farming and pastoral areas would either not have been developed or not prospered without the railways. Their suitability for large-scale military movements of both men and material was also recognised; even Australia's move to standardise various State railway gauges was given impetus by strategic consideration (Butlin, Barnard and Pincus 1982; Carroll 1976).

On another level railways were used, and their construction was encouraged, to further political ends such as employment creation. Indirectly, this resulted in the interconnection of small communities on a regional scale, forging links between major cities and creating a national cohesiveness. Whether this network would prove to be a commercial proposition or lead to extensive cross-subsidisation, was apparently a secondary consideration, given the technological advances that the railways represented in the latter half of the 19th century

over other land-based transport modes (McDonnell Report 1980; Affleck 1978; Blainey 1966).

Many of the tasks and responsibilities that the railways were required to undertake were contained in legislation, even in countries where the principal railways were not government instrumentalities. Even when it became obvious that government-imposed obligations were increasingly rendering the railways uncompetitive in the face of the growing sophistication of road transport, government policy was slow to change.

Aggravating the general rundown of railways during and after World War 2 was the failure of governments to provide funds to help railways to re-equip, modernise and, potentially, to improve efficiency and productivity. In addition, there was little incentive for managements of government-owned railways to find solutions to their problems, since regulation ensured their protection from road competition. In the United States of America (US), however, the managements of private railways were prevented by the Interstate Commerce Commission (ICC) from competing effectively against interstate road transport.

Railways continued to accumulate deficits, especially on their passenger services, instigating State-led reviews of the fundamental role of railways in society in general, and in transport in particular. The recognition of problems, the nature of the reviews and the pace of those reviews varied from country to country. Action depended on how much government ownership and associated subsidies masked the extent of the real problems. It appears, however, that by the early 1980s, all of the countries examined in this report, including Australia, had at least initiated a reformation of all or part of their railways, whether privately or publicly owned, acknowledging implicitly that rail has a future role to play in their national economies.

AIM

This study has three aims:

- to examine how a range of countries and their railway systems have responded to the changing competitive transport environment within which their railway systems operate;
- to explore the institutional and organisational restructuring that has been undertaken to revitalise the railway systems and improve their performance; and
- to review the measures that individual railway systems have introduced in response to these initiatives. In addition, an

attempt is made to relate railway performance to institutional and organisational restructuring.

The study also contributes to the Bureau of Transport and Communication Economics' input into the work of the Railway Industry Council. The Council was established in 1987 with the principal objective of developing a medium to long term strategy to improve the viability and competitiveness of government-owned railway systems in Australia.

SCOPE

The major railways of eight countries have been selected for comparison in this study. They were chosen to encompass a range of institutional settings, sizes and types of task and recent developments, within the limits of available data.

The analysis has been confined to the non-urban public operations of privately-owned and government railways of the US, Canada, the United Kingdom (UK), France, the Federal Republic of Germany (FRG), Japan, New Zealand (NZ) and Australia. It excludes small non-urban, regional and mainly tourist-oriented railways, as well as the freight railways exclusively operated by mining and other companies.

It should be noted that the period of analysis only covers the first half of the 1980s, preceding the privatisation of Conrail in the US in 1986, and the break-up of the Japanese National Railways (JNR) into the Japan Railways Group, in 1987.

OUTLINE

The importance to the economy of transport in general, and railways in particular is discussed in Chapter 2. The institutional, physical, market and technological characteristics of the railway systems and their developments since 1980 are outlined in Chapter 3.

This is followed by an examination of trends in railway performance in Chapter 4. Given the limitations of available data, performance is measured in terms of operating revenue and expenditure levels, the nature and size of government contributions, and freight and passenger productivity. Railway performance is also related to institutional and organisational changes.

Finally, in Chapter 5, the main railway industry developments are summarised and the prospects for advancement of the Australian railways as a viable mode of transport are assessed.

CHAPTER 2 TRANSPORT AND THE ECONOMY

The significance of transport in a national economy can be measured by a number of broad indicators such as transport's share of:

- gross domestic product (GDP);
- household expenditure;
- gross fixed capital formation (GFCF); and
- the total labour force.

However, since the definitions and methods used to measure these indicators vary between countries, only tentative conclusions can be drawn from any international comparisons based upon them. The added problem that transport is often combined with storage and/or communications in data sources such as National Accounts, makes it difficult to isolate completely the significance of transport. The following data, therefore, only serve as a general measure of transport's significance in different economies.

A number of comparative indicators of transport in Australia and in selected developed countries is presented in Table 2.1. Share of GDP represents the broadest economic measure of transport's significance in an economy. Advanced industrialised nations such as the US and the FRG, generally devote between 3.5 to 4 per cent of GDP to transport and storage. In Australia, New Zealand and Canada, transport and storage's share of GDP is generally above 4.5 per cent. Such relative differences may reflect the relationship between the size and structure of the economy, the size of the country and its pattern of trade. Despite such differences, the general trend evident across the developed countries has been the declining share of transport's contribution to GDP (OECD 1987). Manufacturing, finance and community services such as education and health are the three largest sectors of GDP, followed by transport.

Disaggregation of transport's share of GDP on a modal basis is not readily available. National accounts data from the US, however, show

TABLE 2.1 INDICATORS OF TRANSPORT[a] SIGNIFICANCE IN THE ECONOMY: VARIOUS COUNTRIES, 1985

(per cent)

	Transport's contribution to:			
Country	*GDP*[b]	*Household expenditure*[c]	*Gross fixed capital formation*	*Labour force*
Australia	4.6[d]	13.4	11.7[f]	5.5
Canada	5.4	15.8	4.2	5.0
Federal Republic of Germany	3.5	15.0	na	5.6[c]
France	3.7	13.9	na	na
Japan	6.3[c]	9.4	na	5.4[c]
New Zealand	5.8	19.6	8.1	5.5[g]
United Kingdom	4.4	14.9[h]	4.7	3.2
United States	3.7	15.7	3.3	2.9

a. Includes storage.
b. 1984 figures.
c. Includes communications.
d. 1983 figure.
f. Includes communications and comprises public trading and private enterprises.
g. 1986 figure.
h. Excludes postal services and communications.
na Not available.

Sources ABS (1987). BTE (1987a). Central Statistical Office, Great Britain (1986). Department of Transport, Great Britain (1987). New Zealand Department of Statistics (1986a,b). OECD (1987). Statistics Canada (1985).

that railways' share was one-half of 1 per cent of GDP in 1986, making them the third largest modal contributor to GDP after road freight and air transport (US Department of Commerce 1987).

In the mid-1980s, expenditure on transport and communications averaged about 15 per cent of household expenditure among the selected countries. As a general trend, household expenditure on transport has remained relatively constant in Australia, Canada and the US, compared with an approximate 2 per cent increase in the United Kingdom and France, and 1 per cent increase in the FRG since the mid-1970s (Central Statistical Office, Great Britain 1986; OECD 1987).

Transport generally comprises the third largest expenditure component of a household, after rent, fuel and power, and food and beverages (each around 20 per cent of expenditure). In the US and Canada, transport is the second largest component after rent, fuel and power, while in Japan it is the fifth largest expenditure component(OECD 1987).

Transport and storage's share of GFCF for the countries examined, displays a decline since the early 1970s, such that by the mid-1980s, its share averaged between 4 to 5 per cent. Both Australia and New Zealand appear to devote a relatively large share of investment to transport, although the figures for Australia in Table 2.1 include investment in communications.

The vital service function performed by the transport sector for other sectors of the economy, provides it with a significant degree of influence on the overall performance of the economy. The efficient operation of the transport sector will, in part, depend upon the provision of adequate investment. While there is no simple benchmark to suggest what is an adequate level of investment in transport, the general requirement is that, first, lack of investment in transport does not create bottlenecks that inhibit productive capacity and raise the cost of transport, and second, that excessive investment does not produce low capital productivity.

The final indicator set out in Table 2.1 is the share of the labour force engaged in the transport industry. This indicates that the US has the lowest share of total employment in transport, and European countries a slightly higher share of employment devoted to transport at generally between 3.5 to 4.5 per cent. Australia, New Zealand, Canada and Japan (which includes communications) maintain a higher share of employment in transport again, at between 5.0 and 5.5 per cent. In all eight countries, transport's share of employment has decreased since the mid-1970s. The United Kingdom had the largest decrease - 0.9 per cent between 1974 and 1985.

RAILWAYS AND THE ECONOMY

Railways account for only a small share of household transport expenditure, except in Japan (Table 2.2). The purchase and operation of motor vehicles are the most important components of transport expenditure in the group of countries examined here; particularly Australia, New Zealand and the US. This is a reflection of these three countries' relatively high per capita car ownership and high per capita car usage (measured as passenger car-kilometres) (BTE 1987a).

TABLE 2.2 HOUSEHOLD EXPENDITURE BY MODAL SHARE FOR SELECTED COUNTRIES, VARIOUS YEARS

(per cent)

Country	*Railway*	*Bus*	*Taxi*	*Air*	*Other*	*Vehicle purchase*	*Vehicle operation*
Australia (1984)	1.6	1.8	1.2	2.1[a]	0.8	29.8	62.7
Japan (1985)	22.1	2.6	4.3	2.3	1.6	24.9	42.2
New Zealand (1986)	0.5	2.4	0.7	1.7[a]	4.3	41.9	52.2
United Kingdom (1985)	4.6	6.2	na	7.1	3.7	32.1	46.2
United States (1986)[b]	0.4	1.5	1.0	5.8[a]	0.7	38.3	52.3

a. Excludes international.
b. Personal expenditure.
na Not available.

Sources ABS (1986a). Central Statistical Office, Great Britain (1986). New Zealand Department of Statistics (1986a). Statistics Bureau, Japan (1987). US Department of Transportation (1987).

Within the transport sector, the significance of railway employment relative to employment in other modes varies considerably between Australia and a number of other developed countries. While the results of any international comparisons should be treated with caution owing to categorisation difficulties, the figures of Table 2.3 suggest that in Australia railway labour's share of transport employment may be more than twice that of such countries as the UK and the US. New Zealand's relatively low railway employment and significant water transport employment is a reflection of the importance of the railway-owned Cook Strait ferry services between the north and south islands.

TABLE 2.3 MODAL SHARE OF TRANSPORT LABOUR FORCE, VARIOUS COUNTRIES, 1986

(per cent)

Country	*Railway*	*Road Freight*	*Road Passenger*	*Air*	*Water*	*Other Transport Services*
Australia[a]	32.8	37.6	17.3	8.9	3.4	..
Canada[b]	22.7	43.6	16.7	10.7	6.4	..
New Zealand	8.8	29.1	15.5	11.1	18.2	17.1
United Kingdom	15.9	25.6	21.2[c]	5.3	3.1	28.9
United States[d]	10.6	46.3	9.4[f]	18.0	5.8	9.9

a. 1984 figures.
b. 1985 figures.
c. Scheduled services.
d. Full-time equivalent employees.
f. Local and interurban passenger transit.
.. Not applicable

Sources ABS (1986b). Department of Transport, Great Britain (1987). Lotz (1988). New Zealand Department of Statistics (1986b). US Department of Commerce (1987).

Railways generally play a minor role in performing a country's overall passenger task (except in Japan) and that importance appears to be declining. Table 2.4 indicates that other than in the US, the use of the private car has been growing relative to the use of most other modes. In the US, air passenger travel appears to have gained at the expense of private car travel, no doubt facilitated by deregulation of air transport and the profusion until recently of cheap fares. Passenger car travel generally dominates, accounting for over 80 per cent of total passenger-kilometres. This is especially so in Australia, where the share is over 90 per cent. Across the eight countries studied, the railways' share of passenger travel has remained either static or has been declining, even in Japan where the railways' role in passenger travel is very large.

Table 2.5 indicates that railways have a more significant role carrying freight rather than passengers, although there are marked differences between countries, owing to geography, transport policies and traffic mix.

The location and extent of mineral production in Australia has favoured modes such as coastal shipping and railways, which have an

TABLE 2.4 URBAN AND NON-URBAN MODAL PASSENGER-KILOMETRE SHARES: SELECTED COUNTRIES, VARIOUS YEARS
(per cent)

		Mode				
Country	*Year*	*Railway*	*Car*	*Bus & Coach*	*Air*	*Other*
Australia	1985	2.5	90.6	2.3[a]	4.5	..
Canada	1981	0.9	83.2	1.4	13.0	1.5[b]
	1983	0.8	84.6	1.3	11.8	1.5[b]
Federal Republic of Germany	1981	7.3	78.6	12.2	1.9	..
	1983	6.7	82.0	11.3	na	..
	1985[c]	7.4	82.2	10.5	na	..
France	1981	10.2	77.2	5.9	6.7	..
	1983	10.7	79.3	10.0	na	..
	1985[c]	10.7	79.3	10.3	na	..
Japan	1981[d]	40.0	41.0	14.1	3.8	0.8
	1983	39.2	43.9	12.5	3.8	0.7
	1985	38.5	44.7	12.2	3.8	0.7
United Kingdom[f]	1981	7.4	80.3	9.2	0.6	2.4[g]
	1983	7.2	80.7	8.9	0.6	2.5[g]
	1985	7.3	81.2	8.5	0.7	2.2[g]
United States[h]	1981	0.8	83.8	1.7	13.7	..
	1983	0.7	82.8	1.6	14.9	..
	1985	0.7	81.9	1.4	16.0	..

a. Includes trams.
b. Urban transit.
c. From Great Britain transport statistics.
d. 1980.
f. Great Britain.
g. Motor cycle and pedal.
h. Inter-city.
na Not available.
.. Not applicable.

Sources BTE (1987b). CTC (1985). Department of Transport, Great Britain (1987). OECD (1987). DoTC (1987, 1988). Statistics Bureau, Japan (1987).

TABLE 2.5 MODAL TONNE-KILOMETRE SHARES: SELECTED COUNTRIES, VARIOUS YEARS

(per cent)

		Mode				
Country	*Year*	*Railway*	*Road*	*Pipeline*	*Coastal & inland Water*	*Air*
Australia	1985	26.9	31.8	na	41.2	0.07
Canada	1981	53.9	8.9	25.2	11.8	0.2
	1983	53.0	11.9	22.8	12.0	0.2
Federal Republic	1981	25.4	49.6	4.6	20.4	na
of Germany	1983	23.5	52.3	3.7	20.5	na
	1985	27.7	50.5	3.3	18.4	na
France	1981	34.0	45.4	14.9	5.7	na
	1983	33.1	47.5	14.2	5.2	na
	1985	27.4	55.8	13.2	3.6	na
Japan	1981[a]	8.7	40.8	na	50.1	0.06
	1983	6.6	46.0	na	47.6	0.01
	1985	5.1	47.5	na	47.5	0.1
United Kingdom	1981	10.4	55.0	5.5	29.1	na
	1983	9.6	53.1	5.5	31.8	na
	1985	8.3	55.6	6.1	29.9	na
United States[b]	1981	38.0	21.7	23.2	16.9	0.2
	1983	36.0	24.6	23.8	15.4	0.3
	1985	37.2	24.9	23.3	14.4	0.3

a. Figures for 1980.
b. Inter-city.
na Not available.

Sources BTE (1987a). CTC (1985). Department of Transport, Great Britain (1987). Statistics Bureau, Japan (1987). Statistics Canada (1986, 1987). Transport Canada (1984). United Nations (1988). US Department of Commerce (1987).

advantage in handling long-haul bulk commodities. In Japan, the coastal location of industry also favours coastal sea transport, to the extent that it accounts for the same share of the total transport task as road freight.

In Britain, British Rail (BR) faces strong competition from other modes engaged in freight transport. In 1985, over one-half of the task was performed by road and one-quarter by inland waterways. Although less passenger-orientated than Japan National Railways (JNR), BR is still a passenger rather than a freight system. Passenger revenue was 3.5 times greater than freight revenue in 1985.

Railways perform the largest tonne-kilometre task in the US. Road freight has steadily increased its share of rail traffic since the Second World War, and accounted for one-quarter of the freight task by 1985. The pipeline share of this task has remained constant at around 25 per cent, while the extensive system of inland waterways in the US has experienced a steady fall in its share of the freight task in the 1980s.

The figures in Table 2.5 on modal shares for Canada's freight task are estimates and should be treated with some caution. The relatively major significance of railways in this task can be attributed, in part, to the long hauls on the system averaging 860 kilometres compared to 320 kilometres for road freight. Such distances reflect the longer east-west flows of railway traffic, and the shorter north-south flows of road freight.

The FRG and France both have around one-half of their freight moved on roads, with between one-quarter to one-third travelling on railways.

The overall trend amongst the countries covered in this study is the declining task share of railways, and the increasing dominance of road freight.

CHAPTER 3 RAILWAY SYSTEMS CHARACTERISTICS

In this chapter the main characteristics of the railway systems in seven countries being examined are described, together with the various measures that have been taken in attempts to address such problems as lack of clear organisational objectives, the basis and level of State support, levels of bureaucratisation, overcapacity, obsolescence and declining market share. The general response to such problems has brought major changes to the character of a number of railways under review since the early 1980s. The trend of transport regulatory reform has increased the degree of modal competition. In turn, governments have recognised that, for the railways to successfully operate in this new transport environment, many constraints on railways need to be removed. A number of public railways have been set clear performance objectives. Railway management has been made more accountable for its results, and has been provided with more room for initiative and fewer constraints in order to achieve greater commercial orientation. The approach to State imposed non-commercial objectives now involves their clear identification, costing and separation from commercial railway operations. The development of new commercial markets (or the regaining of lost markets) has been enhanced by technical innovations such as the high speed trains. Experimental train and signal technology offers the possibility of increasing railways' share of the commercial transport task through improved service and efficiency.

INSTITUTIONAL SETTINGS

Australia

Transport matters in Australia are largely dealt with at either a Commonwealth or individual State Government level, or jointly. The peak consultative body is the Australian Transport Advisory Council (ATAC), comprising Commonwealth, State and Territory Ministers responsible for transport. ATAC's main role, with the help of modal advisory groups, is to review and co-ordinate various aspects of transport policy, development and administration. The Commonwealth Minister for Transport also receives advice from the Transport

Industries Advisory Council (TIAC) on matters relating to railways and other transport modes. Membership comprises representatives from all modes of transport, with members drawn from private industry, government and government owned enterprises, professional and trade associations, academic institutions and users.

The peak national railway industry body is the Railway Industry Council (RIC), established in 1986 following the endorsement of ATAC members. RIC comprises representatives of Commonwealth and State Governments and railway systems, the Australian Council of Trade Unions and railway unions. The major objective of RIC is to develop a strategy for improving the viability and competitiveness of government-owned railway systems (DoT 1987).

More operationally orientated is the Railways of Australia Committee, comprising the Chief Executives of the five government railway systems. The Committee is largely concerned with the co-ordination of intersystem passenger, freight and marketing activities.

The Australian railway systems

Five government-owned railway systems operate in Australia. The Commonwealth Government's Australian National Railways Commission (AN), maintains lines and services in South Australia, Tasmania, the Northern Territory and Western Australia; as well as operating services on some State government-owned railway lines. AN's business is based upon non-urban railway passenger and freight operations. In New South Wales, the State Rail Authority of New South Wales (SRA) operates freight and urban and non-urban railway passenger services, and road passenger services. The Victorian Government's State Transport Authority operates freight and non-urban railway passenger services under the name of V/Line. Queensland Railways (QR) operates both freight and passenger services, while the Western Australian Government Railways Commission (Westrail) operates freight and non-urban railway and road coach passenger services.

Each railway system operates as a statutory public authority and is responsible to the relevant transport minister. Under the legislation applying to each of the railway authorities, the relevant minister for transport is provided with the opportunity to exercise a degree of direction and control over the operation of the respective systems. AN, Westrail and QR, for example, require ministerial approval before lines can be abandoned. AN rates are required to be set in accordance with principles approved by the Commonwealth Transport Minister, while State government systems require specific ministerial approval for rate changes. Both the SRA and Westrail still have common carrier

status, although Westrail can use discriminatory pricing to discourage the transport of small and uneconomic consignments.

The accountability of a railway system through the setting of objectives and targets has been used to varying degrees. AN for example, must report to the Commonwealth Transport Minister on its 'objectives, strategies and policies', and is accountable for its financial performance against a set financial target approved by the Minister. In Victoria, the Minister for Transport sets quantitative financial targets for V/Line following consultation with the State Transport Authority. These targets have to be attained 'as far as is practical'. V/Line must also observe 23 objectives of a hortative nature, and is required to report on the achievement of these and its financial targets.

State governments regulate intrastate competition between road transport and railways to varying degrees. With the exception of New South Wales, the long distance transport of bulk commodities such as coal, grain and petroleum is restricted to railways by regulation. In Victoria, for example, the main freight restrictions apply to bulk barley, briquettes, limestone, oats, petroleum products and wheat. The transport of these bulk commodities for distances greater than 60 or 80 kilometres (depending upon the commodity) is restricted to V/Line.

Intrastate road passenger services generally operate on a licensing system that provides a degree of protection to the railways. In Queensland, liberal licensing has meant that railway passenger services face competition from either one or a number of long distance road coach operations on each particular route. The Victorian road passenger industry is under V/Line's administrative control, and effectively limits modal competition. Certain routes, however, are contracted out to private coach operators using V/Line livery.

The railway systems receive government financial assistance on different bases and in different forms. Each generally receives some reimbursement for freight and passenger concessions granted by their government. A number of railways also receive reimbursement for services provided at the direction of the government, as well as financial contributions towards costs on such matters as capital servicing, superannuation pensions, redundancy schemes and workers compensation. The SRA, for example, receives a revenue supplement from the State Treasurer, with additional government support provided through meeting the costs of leasing equipment, debt servicing and contributions to superannuation funds. Total government support

provided 37 per cent of SRA's income in 1985-86. In the case of AN, the Commonwealth Government provides two categories of revenue supplement. The first is a supplement for commercial operations based upon an annual estimate submitted to the Government comprising the cash component of the expected loss on commercial operations (freight). The second supplement is for community service obligations, and meets the losses incurred due to direction by the Government to maintain some uneconomic services. These comprise mainland passenger and Tasmanian freight operations. Both supplements provided 18.5 per cent of AN's revenue in 1986-87.

Canada

There are three classes of Canadian railway operator. Class I railways are Canadian National Railways (CN Rail), Canadian Pacific Railways (CP Rail) and VIA Rail Canada Inc. (VIA). These three railways comprise around 90 per cent of the total Canadian railway system. A number of smaller operators (such as British Columbia Railways, which is operated by the provincial government) make up the remaining Class II and Class III railways.

The Federal Government-owned Canadian National operates CN Rail, along with the group's other transport and communications companies. In 1986, the CN Rail division contributed 86 per cent of Canadian National's revenue, with the balance contributed by a nationwide chain of hotels, telecommunications operations, road freight operations, steamships and ferries. CN Rail is the largest railway operator, and accounts for between 50 to 55 per cent of the track length, railway employees and tonne-kilometres of the total railway system. The task performed by CN Rail is almost solely freight operations, as less than 1 per cent of revenue is from urban railway passenger services.

CP Rail is a department of the conglomerate Canadian Pacific Limited, and accounted for 16 per cent of the group's revenue in 1985. Canadian Pacific Limited is also involved in trucking, airlines, ocean shipping, resources, telecommunications, steel and US railroads through the Soo Line. CP Rail is a freight railway and accounts for approximately 30 to 35 per cent of the Canadian railway system on the basis of track length, railway employees and the tonne-kilometre task.

VIA is a crown corporation operating under agreement with the Federal Government to manage and operate railway passenger services in Canada. As an amalgamation of former CN Rail and CP Rail railway passengers operations, VIA has operating agreements with both railways for use of their track facilities, train personnel and rollingstock servicing and refurbishing. In 1985, these operating agreements with the freight railways accounted for 55 per cent of VIA's expenses.

In comparison with other Canadian modes, the railways are the dominant recipients of direct transport subsidy payments (CTC 1987). The Western Grain Transportation Act 1983 provides subsidies for grain handling in Canada, and totalled $C496 million or 8 per cent of combined CN Rail and CP Rail revenue in 1985. Payments, to compensate railways for uneconomic services operated as an imposed public duty, are made under the Railway Act, and amounted to $C59 million in 1985. In addition, specific government funding for VIA operating expenditure amounted to $C524 million in 1985, as well as capital funding of $C108 million.

The Canadian railway system is subject to institutionalised direction and constraint from a number of sources. The Federal Minister of Transport receives advice on transport objectives, strategies and policies from Transport Canada's Policy and Co-ordination Group. The Group develops and implements economic policies and programs for the various modes, provides advice on crown corporation matters such as the level of government subsidies to VIA, and administers the subsidies to the railways. Also within Transport Canada, a Surface Group is charged with ensuring that adequate levels of safety are maintained by each of the modes.

The 1987 National Transportation Act replaced the Canadian Transport Commission (CTC), and established the National Transportation Agency (NTA) as the administrator of Canadian transport regulation from 1988. Under the 1967 National Transportation Act, the CTC had operated through modal committees that administered regulations and payments under the various transport related acts. A separate committee dealt with review and appeals on CTC modal committee decisions. Direction to the new nine member NTA is provided by policy instructions from the Minister for Transport, which are also laid before both houses of Parliament. The agency can conduct investigations when requested by the Minister, and supervise and arbitrate on disputes between carriers and shippers. Any decisions of the agency can be revised or revoked by the Government, while an appeal mechanism exists for shippers and carriers against any decision or regulation of the agency.

The 1967 National Transportation Act gave carriers greater freedom to set rates according to what the market could bear, and helped achieve a better base for intermodal competition. This approach has been further extended in the 1987 National Transportation Act with new rules for greater intramodal competition. Three main areas were reformed under the Act: freight rates, access to railway services and railway lines.

Railway operators can no longer collectively set their rates. They may however, negotiate confidential contracts with shippers, which are then filed with the NTA. The rates set must cover the variable cost of carrying the particular freight. Where a shipper is 'captive' to one railway at the point of freight origin or destination, they may request the local railway to set a competitive line rate to or from the point served by the local railway and the nearest interchange with another railway. A dispute over the rate may go to the NTA for settlement. The remaining areas to be affected by the new Act is the greater ease for railways to sell lines to independent operators who run short line services. The level of line abandonment is restricted to no more than 4 per cent per year until 1992, and successful shipper objections and government directions can keep lines open.

Federal Republic of Germany

Deutsche Bundesbahn (DB) is a publicly-owned enterprise, subject to the 1982 Federal Railway Act, and operating within the Federal Ministry for Transport.

The new Act effectively liberalised constraints on DB's management and allowed for more commercial freedom, especially in the planning and construction of new high-speed lines, and the marketing and sale of innovative services. In conjunction with this legislative re-orientation, DB's management structure was reorganised with the clear objective of restoring the railways' competitive edge with both road and inland water transport into which there had been significant post-war investment (IRJ 1983, 22-23; Gohlke 1980). Without the aid of a contract between the Federal Government and DB, the task of the railway's new management was to exploit, more effectively than the old Board, the funds available under a new investment program, to reduce operating costs and to improve productivity.

Two executive bodies have the task of operating DB as a business enterprise. The Executive Conucil comprises 20 members appointed by the Federal Government. Proposals for membership are put forward by the Federal Minister for Transport, the Upper House of the FRG parliament, trade and industry and trade unions. Executive Council members are not bound by any orders or instructions and decisions made are binding on the DB Board of Management.

The Board of Management consists of eight board members, including a Chairman and Deputy Board Member. Appointed under contract, members have responsibility for both overall management and for an individual functionally defined department. The major departments comprise Sales, Production and Engineering, with support provided by Finance

and Legal Matters, Staff and Social Services as well as Control and Planning.

Advising both the Executive Council and the Board of Management is a board of industry orientated members, representing major DB customers in iron and steel, manufacturing and distribution.

DB receives financial support from the Federal Government on three main bases. These are compensation for mandatory social services, the bulk of which is concerned with local passenger operations, social service supplements to employees, and investment support. Taken together, federal grants provide about one-third of DB's income.

The overall transport policy of the FRG provides a significant degree of protection to DB. Control over medium (greater than 50 kilometres) and long distance road freight transport is exercised through a quota system that limits access to the market, and rate regulations. Similarly, a strict policy of control on private road passenger services has effectively excluded the development of a system of regular inter-city bus services.

In addition to railway operations, DB has interests in a number of other businesses. These include freight forwarding, local bus services, tourist bureaux, catering, data processing, Lufthansa airlines, banks, and advertising and consultancies.

France

The Societe Nationale des Chemins de Fer Francais (SNCF) is a commercial public corporation operating the French railway network.

Since its reorganisation as a public corporation in 1983, SNCF has been administered by a Board of Directors consisting of 18 members appointed for five-year terms. Although SNCF has been given management autonomy, the government is involved in various aspects of its operations. The government participates in the preparation of SNCF's annual operating and capital budgets, as well as the financing of some capital expenditures, the setting of passenger fares and freight rates and in decisions concerning the expansion of railways throughout France (SNCF 1984).

The relationship between the State and SNCF is formalised through two operating documents. The 'Cashier des Charges' sets a contractual relationship between government and local authorities and SNCF, and establishes the principles for community service obligations and State financial support. The 'Contrat de Plan' determines the method for the calculation of compensatory payments. SNCF is also set

commercial, operational and financial targets to be achieved under the contract. The overall aim established by the 1985 to 1989 contract is the elimination of the railways' deficit by 1989.

French transport policy on modal competition is broadly similar to that of the FRG, in providing the railways with a degree of protection. Tonnage capacity restrictions, for example, apply to medium and long distance road transport.

Japan

Japan's railway system was composed of both a public national railway system and a number of private regional railways. A major restructuring of the public railway system occurred in April 1987 when seven government-owned railways took over operation of the JNR system and collectively became the Japan Railways Group (JR).

JNR was a public corporation subject to the general supervision and instructions of the Minister of Transport. Aside from railways, the corporation also operated bus and ferry services, subsidiary enterprises such as department stores, restaurants, communications businesses and information centres.

The restructuring of public railway operations has been in response to the level of accumulated debt, overstaffing and administrative inefficiency. The introduction of a number of Management Rehabilitation Plans since 1969 had failed to stem enormous recurring deficits and the accumulation of liabilities generated by freight and local services. Personnel expenses (especially employee pensions) and government restraint on JNR tariffs, further contributed to JNR's poor financial position.

Direct government financial support of JNR was provided through a number of Financial Rehabilitation Plans. These plans provided financial assistance in the form of deferred interest payments on some loans, and interest subsidies on others. In JNR's General Account, financial rehabilitation subsidies provided around 7 per cent of operating revenues. A Separate Account for Specified Government Loans encompassed government subsidisation of interest on financial rehabilitation loans.

It was JNR's relationship with the government and its effect on performance that was identified by the 1983 JNR Reform Commission as an area that had to be addressed in any restructuring. Although JNR was subject to the general supervision and instructions of the Minister of Transport, its management executives could be called before the Parliament (Diet) to explain any matters relevant to JNR's operations.

JNR's freedom and flexibility in tariff setting was constrained by the requirement to gain the Minister's authorisation for rate changes within a certain limit, and the Diet's approval for changes above this particular limit. The overall result was that the government was effectively deciding tariff levels.

A further encroachment on management prerogatives involved the restriction of JNR operations to railway and related services, as well as direction to provide certain services with no clear rules for compensation. In the early 1980s, JNR was, therefore, a public corporation subject to government intervention at the most basic levels of management, and unable to take clear management responsibility for its operations. After an investigation by the JNR Reform Commission, the break-up of JNR into a number of regional railways, and their eventual privatisation was advanced as the only satisfactory way to rehabilitate the railway system.

Under the new structure of the Japan Railways Group, six regional passenger railway companies and a Shinkansen organisation operate, along with a nationwide freight-railway company. Each company incorporates the assets and, subject to assessment of possible commercial success, some of the liabilities of JNR. JNR itself has been re-established as a settlement-of-accounts enterprise, and in the first instance owns the stocks of the freight and passenger railway companies. It is intended that as the financial position of the companies improves, stock in each of the companies will be sold to the private sector. In order to achieve this, around 40 per cent of JNR's liabilities have been inherited by the successor corporations, and the remainder transferred to the JNR settlement-of-accounts enterpise. Repayments of liabilities will be financed from the sale of both stock in the new companies, and land no longer used in JNR business.

The degree of control in comparison with a public corporation has been reduced although, against the standard of recent overseas reforms, government intervention in management is still considerable. The issuing of bonds, long-term borrowings, appointment and dismissal of representative directors are still subject to ministerial approval. Similarly, the key areas of fares and charges, train schedules, suspension or termination of services and construction of railway facilities, are subject to authorisation by either the Minister or the Government. The areas left unrestricted in the new companies include budgeting, fund planning, and the power of appointment and dismissal over a larger proportion of the executive management than previously. The companies have also been permitted to engage in a wider scope of business than simply railway operations, although any action in this area requires consent from the Minister of Transport.

An assessment of the effect of Japan's public railway restructuring on performance is difficult owing to its recent implementation and the interim nature of many of the arrangements on the path to eventual privatisation. In the past, the susceptibility of railways' management to government intervention had been identified as a significant factor contributing to JNR's administrative inefficiency and financial malaise. The present reforms, although providing management with a greater degree of discretion, continue to define close limits within which the management of the new companies can operate.

The break-up of JNR presented an opportunity to deal with the public railway system's chronic overstaffing. From around 277 000 employees in 1985, the combined number of employees under the new Japan Railways Group had been reduced to 215 000 when it began operations in April 1987. About half of this reduction had been achieved through voluntary redundancy, with the remainder having had employment arranged with central and local governments, as well as private organisations.

New Zealand

The New Zealand Railways Corporation (NZR) is a government-owned enterprise operating railway, ferry and road services in New Zealand. The New Zealand Railways Corporation Act 1981, charges NZR with responsibility for establishing, maintaining and operating safe and efficient rail, road and ferry services for both passengers and freight.

The Corporation is controlled by a Board of Directors reporting to the Minister of Transport. Three business sectors form the basis of the NZR operational structure. These comprise the Passenger Business Group, the Railfreight Systems Group and the Property Business Group.

The Corporation's Act allows it to enter into arrangements with the government, local authorities and persons in respect of financial contributions towards the cost of carrying out any service or activity. In 1986, these social service contributions accounted for 15 per cent of the Corporation's railway and road revenue.

In the mid-1980s there were a number of new legislative arrangements in New Zealand that allowed greater modal competition between railway and road services. The 1983 Transport Amendment Act (No 2) permitted road competition with railways over distances greater than 150 kilometres, with qualitative rather than quantitative licensing and freedom for road operators to set their own rates.

United Kingdom

British Rail (BR) is operated by the British Railways Board (BRB), a body comprising a Chairman, two Vice-Chairmen, two joint Managing Directors of Business and Production respectively, and eight part-time members all appointed by the government. Functional subsidiaries are operating as Boards and limited companies cover such areas as engineering, maintenance and consultancy. Effective overall control of BR is exercised by the Chairman and the two joint Managing Directors.

The duties of the Board require it to 'secure that the combined revenues of the authority and of its subsidiaries taken together are not less than sufficient to meet their combined charges properly chargeable to revenue account, taking one year with another' (Transport Act 1968). Also '...the British Railway Board shall from 1 January 1975 operate its railway passenger system so as to provide a public service which is comparable generally with that provided by the Board at present' (Railways Act 1974 - Direction by the Secretary of State 19 December 1974).

Supplementary to their statutory and financial duties, the government, through the Secretary of State for Transport, periodically sets out in detail the objectives the Government wishes the Board to pursue. The 1983 objectives set by the Government were stated as, '...provision of a reliable, attractive and punctual service at acceptable fares and charges, but at reduced cost to the taxpayer...' This was further reinforced in 1986 with the requirement that the Board needed to offer customers an efficient railway providing good value for money.

Under the 1974 Railway Act, BR's passenger system is required to maintain the same level and quality of passenger services as existed in 1974 and, at the same time, cover total costs out of fare revenue and Public Service Obligation (PSO) grants combined. The PSO is required to conform with European Economic Community (EEC) regulations that allow compensation necessary to ensure the adequate provision of transport services.

Recent British railway restructuring has been directed at substantially reducing the level of government financial assistance to BR, and increasing private sector participation. Promotion of the latter area has been seen by the British Government as important in helping to achieve the former objective. Similarly, the introduction of sector management has allowed the government and management to set specific financial objectives as the bottom line in assessing railway performance.

As with many railway systems, BR was administered on a geographical basis divided into regions and divisions, each with its own management. Functional management provided resources such as rollingstock, manpower and finance, and regional management provided services to the customer.

Under administrative changes first introduced in 1982, BR has been split into a Business Group and a Production Group. Each of the various business sectors that form the Business Group develop strategies under a director to achieve a set financial target. Such matters as trains required, fare levels and investment projects must be established, and then negotiated with the Production Group. The introduction of the five business sectors (InterCity, Network SouthEast, Provincial, Freight and Parcels) made sectorial directors responsible for not only the marketing of their respective business, but also the cost of resources needed to carry the traffic. This approach rests on an accounting system that is able to allocate costs to a sector, while recognising the realities of shared resources. In the situation where a business sector may wish to initiate a new service, the Production Group will advise on the costs of its provision. It is then up to the business sector whether the expected net outcome is consistent with, or can be accommodated within the overall financial objectives set for the sector. This process helps to establish recognition that service changes cannot be achieved without the associated responsibility of cost implications.

The British Government's policy of greater private sector participation has sought to provide customers with a more cost-efficient and competitive service as a means of improving railway finances. Part of this approach has involved such measures as greater commercial exploitation of BR assets in partnership with private interests, and competitive procurement of rollingstock and catering. A second element has involved the sale of non-core railway operations to the private sector. The 25 establishments of British Transport Hotels were sold to the private sector during 1983, followed by the 1984 sale of Sealink UK to Sea Containers. A recent and more strategic move is the BR intention to sell British Rail Engineering Ltd to the private sector. This general approach by the government and the Board suggests that BR operations will finally be confined to a core structure that can be tightly controlled through sector management, and progressively weaned from government financial support. Indeed, for the three years to 1986-87, government support was reduced by 27 per cent, while the 1987 Corporate Plan envisages a further 25 per cent reduction from £736 million in 1986-87 to £555 million in 1989-90. Presently, the Network SouthEast Sector and the

Provincial Sector are the two business sectors that receive PSO grants from the central government. The Passenger Transport Executives of large metropolitan authorities outside of London contribute about 10 per cent of the PSO grant, and direct their contribution to such measures as maintaining fares at a certain level in their region.

United States of America

The main regulatory body covering the general operation of railways in the US is the Interstate Commerce Commission (ICC). The Commission was created by the Federal Government in 1887 for the purposes of regulating commerce. In general, the ICC's jurisdiction covers matters of tariffs, finance, operating authority, service, accounting and valuation. It is in charge of regulating those railways, motor carriers, water carriers, pipelines and freight forwarders operating in interstate commerce.

The Federal Department of Transportation is charged with the development of transport policies and the administration of programs. Under the Department there are two main arms of government which pertain to the railways, the Federal Railroad Administration and the Urban Class Transportation Administration. The latter is the federal agency responsible for providing financial assistance to US cities to improve mass transportation. The former administration is left with the role of co-ordinating administration of transport programs and services provided by private railways.

The principal railways in the US are those designated as Class I railroads. In 1986, Class I railroads were defined by the ICC as railways with annual operating revenues greater than US$88.6 million. The 16 Class I railroad systems (excluding Amtrak) account for approximately 94 per cent of the industry revenues, 91 per cent of its employees and 83 per cent of the track length. In addition to the Class I railroads, there are approximately 480 regional railways (operating either 463 kilometres or more of track, or generating in excess of US$40 million in annual revenue), local railways, and switching and terminal railways operators (Rockey 1987).

All Class I freight railroads are operated by the private sector. Stock in the Consolidated Railroad Corporation (Conrail), one of the two largest railways, and previously 85 per cent owned by the Department of Transportation, was acquired by private interests in 1987.

The National Railroad Passenger Corporation (Amtrak) was created as a federal agency responsible for the provision of nationwide

passenger railway services, when the Rail Passenger Service Act was enacted in 1970. Under the Act, railways were given the option of either joining Amtrak or continuing their passenger services without public subsidy. Capital and operating expenditure for Amtrak are budgeted by the Administration and voted by Congress. Other than a corridor along the north-east coast, Amtrak relies upon the use of the track and facilities of private freight-hauling railways. It reports directly to Congress and is not subject to policy intervention from the Administration, or regulation by the ICC over rates or service levels.

Major regulatory reform of the US transport industry occurred between 1976 and 1980, and affected railways, air cargo, air passengers, motor carriers and buses. The two acts directly affecting the railway industry were the Railroad Revitalisation and Regulatory Reform Act of 1976 (4R Act), and the Staggers Rail Act of 1980. Until the introduction of these acts, the railway freight industry operated under economic regulations left over from a period when railways monopolised freight transport. Extensive rate restrictions and commodity rules designed for the late nineteenth century eventually restricted railway's pricing and investment decisions as other modes developed in competition. The economic malaise of the railway industry by the 1970s was reflected in the bankruptcies of a number of major railways.

Conrail's establishment in 1973 to take over a number of bankrupt north-eastern railways, was a holding action brought in by the Federal Government until wider changes affecting the industry could be made.

The 4R Act was the first legislative response that attempted to deal with the underlying causes of the industry's situation. Included in the Act were regulatory reforms that allowed railways a zone of rate freedom within which they could change rates without ICC supervision; a scheme of minimum and maximum rates determined by the variable costs and market dominance; and time limits for ICC decisions on mergers and rate proposals.

The Staggers Rail Act was aimed essentially at reviving the physical and financial position of the railways by providing greater flexibility in railway management.

The Act allowed:

- a minimum/maximum rate control scheme;
- a zone of rate freedom, whereby rates could increase by the amount of a cost recovery index, plus a percentage;

- explicit permission for shippers and carriers to enter into rate and service contracts;
- reduction in the required notice period for increases or decreases in rates;
- curtailment of rate making activities by several railways meeting together at any time in cases where such actions are most likely to be anti-competitive; and
- reduction in the time element for a decision by the ICC on a merger proposal.

While not 'deregulating' the industry, the Act has expanded the degree of discretion open to management, most notably in responding to price and service competition, and the shedding of unproductive plants.

In line with changes in the institutional environment, the structure and character of the railway industry (centering upon the Class I railroads) has changed considerably since 1980. From the previous dozens of major railways that covered limited geographical areas, a procession of railway mergers has progressively formed railways with extensive route corridors, covering up to 20 or more States. The first major merger formed the initially government-owned Conrail system. There have since been mergers involving a large number of other private freight railways. Burlington Northern, CSX Corporation, Union Pacific and Norfolk Southern are the four major railways resulting from railway mergers, and collectively account for about around half of Class I revenues.

The ICC has not totally endorsed railway mergers. In mid-1986, the ICC rejected the three and a half year unapproved Santa Fe-Southern Pacific partnership, a partnership that was expected to receive approval from the ICC. While content to see end-to-end mergers, the ICC appears concerned with the anti-competitive results of allowing railways with overlapping routes such as Santa Fe and Southern Pacific to combine. The end result of the process appears to be six or seven railways dominating the US railway freight traffic.

Further restructuring of the major Class I railroads has occurred through greater management control in shedding surplus and unproductive resources. Between 1980 and 1986, track ownership was reduced from 435 432 kilometres to 375 226 kilometres, a reduction of 13.8 per cent. During the same period, the Class I system reduced its locomotive fleet by 25.5 per cent, and its freight car fleet by 31.6 per cent (AAR 1987). The extent and rate of uneconomic branch line

abandonment and equipment reduction has been encourged by the Staggers Act providing the ICC with both expedient line abandonment procedures, and discretion not to grant redundancy packages to the workers affected. The effect of this on Class I employment has been reflected in a fall in adjusted employment (to take account of Class I railroads declassified to Class II) from 447 213 to 274 200 over the 1980 to 1986 period, or a 38.7 per cent decline.

The corollary to the contraction in the physical size of the Class I railroads has been the establishment of over 150 short line and regional railways from the sale of lines by the major railways. These railways are light density systems, often acting as feeders to the Class I mainline railroads. The success of short line and regional operations is generally based upon the use of non-unionised labour employed on a lower wage package than Class I employees, and their flexible deployment. This has enabled the continuation of railway services that might otherwise have been abandoned. Between 1980 and 1987, some 28 000 kilometres of track had been taken over by short line and regional railways, with the largest single amount comprising 3000 kilometres of the former Soo Line, now operated by Wisconsin Central Limited.

The traditional limit on railway acquisition of other carrier transport has also been liberalised in recognition that properly developed intermodal transport offers the opportunity to reduce transport costs through smoother, quicker and less frequent transfers of goods and documentation. A number of railways have responded by attempts to become 'total transport companies that provide goods transport from origin to destination by different modes. The CSX Corporation, for example, has acquired one of the largest US barge lines, as well as merging with the container shipping and trucking company Sea-Land. In contrast to the Santa Fe-Southern Pacific merger decision, the ICC found that there was no competititon between CSX railway business units and Sea-Land, and approved the merger.

The recent restructuring of the once rapidly deteriorating US railway industry has been made possible by its removal from a highly regulated environment, to one where management initiative determines performance. There are also indications that the characteristics of railway managers and organisational structures have changed in response to increased managerial discretion (Grimm, Kling and Smith 1987). The average age of railway managers appears to be decreasing, railways are making greater use of bringing in specialist managers from outside the firm, and the educational level of management has increased. Management background, however, is still heavily dominated by people with engineering and operations experience.

The organisational structures of the various railways now appear to be leaner through reductions in the number of departments, greater decentralisation and reductions in the size of the senior management. Greater commercial orientation is also evident as the once numerically strong operational departments are being reduced in size, and overtaken by the marketing/sales department approach to operations. The corporate structure of Conrail, for example, has an Assistant Vice-President and a General Superintendent of Car Management reporting to the Senior Vice-President of Marketing.

This more commercial approach by the major railways has been highlighted by Burlington Northern's marketing structure that developed after the Staggers Act. Responsibility for decisions on rates were moved downwards in the firm, to commodity based business units composed of generally junior people trained in a particular commodity market.

United States railway restructuring has to a significant degree been based on the flow-on effects from regulatory reform of the railway industry and wider transport reforms. In response to increased modal competition, a continuing decline in railway tonne-kilometres and freight market share, major railways have moved to consolidate to a more efficient scale via mergers and rationalisations, diversification into complementary transport modes, and by approaching management and operations from a greater commercial viewpoint (Grimm and Harris 1983).

SYSTEM SIZES

In tandem with the direction of institutional changes, the physical size of many of the overseas systems has changed significantly. Table 3.1 presents the length of track, number of employees and track length per employee for the major railway systems of the selected countries. Table 3.2 details the number of locomotives and rolling stock for three selected years. Of the selected countries, the largest railway system in terms of length of track in 1985 was in the US, with a length of 389 892 kilometres. The smallest railway network was found in NZ, with just over 4000 route-kilometres.[1] It is clear from Table 3.1 that, except in Australia, railway networks have been contracting since 1981, possibly reflecting efforts to eliminate low-density, unprofitable lines. In Australia, the expansion of route-kilometres

---

1. Route length does not take account of the number of tracks on route, nor the length of sidings. Track length includes all track.

TABLE 3.1 RAILWAY SYSTEMS' TRACKAGE AND EMPLOYEES: VARIOUS COUNTRIES, VARIOUS YEARS

Country	*Year*	*Track length (kilometres)*	*Employees*	*Track length per employee*
Australia	1981	40 055[b]	109 621	0.4
	1983	41 457[b,e]	106 064	0.4
	1985	42 719[b]	105 027	0.4
Canada[a]	1981	83 651	na	na
	1983	88 134	84 500	1.0
	1985	85 762	83 290	1.0
Federal Republic of Germany	1981	65 499	324 871	0.2
	1983	64 523	307 246	0.2
	1985	63 272	294 710	0.2
France	1981	34 596	249 020	0.1
	1983	34 710	251 220	0.1
	1985	34 676	238 775	0.1
Japan	1981	21 322	401 362	0.05
	1983	21 387	358 045	0.06
	1985	21 091	276 774	0.08
New Zealand	1981	4 433[b]	20 467	0.2
	1983	4 332[b]	20 209	0.2
	1985	4 266[b]	17 638	0.2
United Kingdom	1981	42 760	205 000	0.2
	1983	41 302	183 100	0.2
	1985	39 448	168 100	0.2
United States[a]	1981	430 550	456 855	0.9
	1983	416 253	341 507	1.2
	1985	389 892	323 946	1.2

a. Class I railroads.
b. Route length.
e Estimate.
na Not available.

Sources Derived from AAR (1987). AN (1985). CTC (1985). DB (1985). Department of Transport, Great Britain (1987). JNR (1986). NZR (1986). QR (1985). Statistics Canada (1986). SNCF (1985). SRA (1985). STA (1985). VRB (1981). Westrail (1985).

is primarily the result of network growth by QR and the SRA, associated with certain export freight traffics, like coal, and additions to suburban lines.

It is also evident from Table 3.2 that all of the railways have larger freight than passenger stocks. This, however, does not necessarily indicate the relative degree of emphasis placed on freight operations. It should be noted that the number of freight wagons does not necessarily indicate the number of wagons in use. In some countries, the stock of freight wagons is large but the actual number in use is much less. However, railways often use their customers' wagons to augment their own fleet.

In general, holdings of both locomotives and rollingstock declined between 1981 and 1985, although Australia (and QR and the SRA, in particular) was the exception to this pattern. Contained within the programs of net (real) fleet reductions, however, are also replacement activities which introduce more efficient locomotive power and rollingstock capacity.

For example, in France, the number of passenger carriages declined from 15 762 units to 15 407 units between 1981 and 1985, but this reduction actually included SNCF's acquisition in early 1985 of new passenger carriages and push-pull units of stainless steel-bodied vehicles. These are produced in sets of three or four cars and can operate in up to three coupled car sets. The sets can reach a top speed of 140 kilometres per hour hauled and 120 kilometres per hour propelled.

Similarly, JNR received in 1985 new model Shinkansens (the Series 100), which were designed to compete with aeroplanes by providing wider seats, double-deck cars with a luxurious dining room, and compartments for first-class passengers. A car sleeper service has also been introduced between Tokyo, and Kokura; the service carries passengers in sleeping cars with their automobiles on the same train.

Between 1981 and 1985, employee numbers have declined. This trend, along with declining rollingstock and track network, is indicative of the physical contraction that railways had generally undergone during this period. This rationalisation of resources was not, however, necessarily accompanied by a uniform decline in the traffic task.

Table 3.1 also shows that countries vary widely in their track/ employee ratio, reflecting the nature of their task and the physical size of the system in each country. For example, in countries like the US and Canada, where long haul railway freight predominates (see

TABLE 3.2 RAILWAY SYSTEMS' TRACTION AND ROLLINGSTOCK: VARIOUS COUNTRIES, VARIOUS YEARS
(thousands)

Country	*Year*	*Locomotives*	*Passenger carriages*	*Freight wagons*	
Australia	1981	2.0	2.2	65.9	
	1983	2.1	2.1	62.7	
	1985	2.1	2.0	60.9	
Canada[a]	1981	na	na	na	
	1983	3.6	na	149.4	
	1985	3.1	0.6	115.0	
Federal Republic of Germany	1981	7.1	17.7	284.4	(50.8)
	1983	6.9	14.2	266.3	(50.4)
	1985	6.6	13.5	256.6	(50.2)
France	1981	6.1	15.8	167.2	(83.3)
	1983	6.0	15.8	159.5	(80.3)
	1985	5.9	15.4	144.0	(75.6)
Japan	1981	3.8	23.8	98.0	
	1983	3.6	22.2	63.5	
	1985	2.8	20.8	39.5	
New Zealand	1981	0.5	0.4	27.7	
	1983	0.5	na	25.8	
	1985	0.4	na	23.3	
United Kingdom	1981	3.3	16.3	87.9	(17.2)
	1983	3.1	14.9	53.9	(15.9)
	1985	2.8	14.2	38.8	(14.5)
United States[a]	1981	27.8	1.8	1 111.1	
	1983	25.8	1.9	1 007.2	
	1985	22.9	1.8	867.1	

a. Class I railroads.
na Not available.

Note Figures in parentheses indicate numbers of non-railway owned freight wagons.

Sources Derived from AAR (1987). AN (1985). JNR (1986). NZR (1986). QR (1985). SRA (1985). STA (1985). Statistics Canada (1986). United Nations (1988). VRB (1981). Westrail (1985).

Table 2.5), the track/employee ratio in 1985 was one or greater. Australia had the next largest ratio, with one-half a kilometre of track per employee, followed by the more passenger-oriented railway systems in countries like the UK, FRG and France. Japan's JNR has the lowest track/employee ratio at 0.07. Somewhat paradoxically, given its freight orientation, NZ railways has a similar ratio to that of DB and BR.

TASKS PERFORMED

Table 3.3 gives an overview of the non-urban task the railways were engaged in between 1981 and 1985 in the countries under review. As is to be expected, JNR had the largest passenger task, while in aggregate, the US Class I freight railroads performed the largest freight task.

Table 3.3 also shows that after a general decline in railway traffic between 1981 and 1983, railway business in some countries recovered by 1985 to pre-1981 levels. This development was most evident in France and the US with regard to passengers, and in Australia, the FRG and US, in freight traffic.

In relation to freight operations, the level of traffic fluctuations depend on a variety of factors, one of which is changes in the general level of economic activity. In addition, a small number of commodities account for a large share of railway freight; and make railways' level of task vulnerable to the fluctuations in demand for a few commodities.

In 1985, the US's major rail commodity was coal, accounting for 40 per cent of Class I total tonnage. In Canada, the major commodities were minerals and grain. Similarly, BR's major commodity was coal, and accounted for about 54 per cent of total tonnes carried. The railway freight components of the FRG were similar to those of other European countries as iron, steel and coal accounted for approximately 53 per cent of total tonnage. DB's next major component, capital and consumer goods, accounted for only 12 per cent of total tonnage in 1985.

In Japan, containerised cargo played a significant role, constituting approximately 18 per cent of JNR's total freight tonnage, closely followed by oil (17 per cent) and cement and limestone (13 per cent and 11 per cent, respectively). SNCF's major freight components, in terms of tonnes carried, were iron and steel at 16 per cent, and coal at 11 per cent.

TABLE 3.3 NON-URBAN RAILWAY TRAFFIC TASK: VARIOUS COUNTRIES, VARIOUS YEARS

(Thousand million)

Country	*Year*	*Passenger-kilometres*	*Tonne-kilometres*
Australia	1981	.01[a]	36.5
	1983	.01[a]	34.5
	1985	.01[a]	44.8
Canada[b]	1981	3.0	220.0[e]
	1983	2.4	206.5[e]
	1985	2.5	217.6
Federal Republic of Germany	1981	34.8	60.9
	1983	31.2	60.6
	1985	33.8	62.9
France	1981	48.1	64.2
	1983	50.4	59.5
	1985	53.1	58.4
Japan	1981	82.5[c]	33.4
	1983	83.6[c]	27.1
	1985	87.1[c]	21.6
United Kingdom	1981	29.7	17.5
	1983	29.5	17.1
	1985	29.7	15.3
United States[b]	1981	7.5	1238.8
	1983	6.6	1209.3
	1985	7.6	1280.4

a. Passenger journeys.
b. Class I railroads.
c. JNR figures excluding local trains.
e. Estimate.

Note New Zealand non-urban passenger-kilometres totalled 200 million, and tonne-kilometres 3.2 thousand million in 1985.

Sources AAR (1987). AN (1985). DB (1985). Department of Transport, Great Britain (1987). New Zealand Department of Statistics (1986c). JNR (1986). NZR (1986). QR (1985). SNCF (1985). SRA (1985). STA (1985). Statistics Canada (1986). US Department of Transportation (1987). VIA (1986). VRB (1981). Westrail (1985).

Australian government railways carried 142 million tonnes of freight in 1983-84, of which the largest component was coal, carried predominantly on the two major systems, SRA and QR. Grain, and ores and minerals were the major freight commodities of V/Line and Westrail respectively, while AN's dominant freight component was general freight.

TECHNOLOGICAL DEVELOPMENTS

Conventional High Speed Rail

High speed railways have received considerable public attention through significant advances in the technology used, and its attempts not only to regain markets lost to other modes but also to tap new markets between road and air.

The cost of line construction and equipment development, has produced a range of national approaches to the introduction of high speed railways. The British high speed railway system represents the low cost option, using conventional diesel-electric powered equipment on upgraded existing track. The more expensive option involves the building of new dedicated high speed track, which both Japan and France have done and are continuing to do, and which the FRG is in the process of completing.

Britain's effort at high speed operations over the last decade has centred upon the High Speed Train (HST) 125 diesel-electric powered locomotives. Designed to attain maximum speeds of 200 kilometres per hour for inter-city routes, the HST however, shares track with freight and commuter trains. A new generation of high speed electric locomotives, the Class 91, will first begin operations between London and Leeds in late 1988. Capable of 225 kilometres per hour, services to Newcastle and Edinburgh will be introduced in May 1991 when the electrification of the east coast main line is completed. A saving of 35 minutes in journey time is anticipated over the present InterCity 125 London-Edinburgh schedule.

In France, the choice was made in the late 1970s to build dedicated high speed passenger railway track to achieve the full benefits of high speed technical capabilities. The Trains a Grande Vitesse (TGV) runs through lightly populated countryside and connects to existing lines on the outskirts of the major cities. The system had initially been designed to traverse steep grades (which avoids tunnelling), and lightly populated areas to help minimise construction costs. The first fully operational line was opened in 1983 between Paris and Lyon. TGVs also radiate further south-east from Paris and Lyon on

conventional lines to such cities as Lausanne and Marseilles. The TGV maximum speed on conventional lines is restricted to between 160 and 200 kilometres per hour, and rises to 270 kilometres per hour on dedicated lines.

A second high speed network, the TGV Atlantic, is planned for completion by 1990 while a third TGV corridor (TGV Nord) was approved by the French Government in late 1987, providing a 300 kilometre per hour line from Paris to Lille, the Channel Tunnel and the Belgian border by 1993. Other high speed projects presently being considered include extension of the TGV South East line around Lyon and south to Valence, and a TGV East from Paris to Strasbourg to link up with DB's developing high speed network.

In the FRG, high speed railway services are presently provided by DB's InterCity (IC) system, at maximum line speeds of 200 kilometres per hour. A stage further in high speed development is the InterCity Express (ICE), which will begin to offer high speed passenger services in mid-1991. Two ICE dedicated north-south lines of 426 kilometres are under construction between Mannheim-Stuttgart and Hannover-Wurzburg. The Hannover-Wurzburg line cuts through a tract of mountains and deep valleys, requiring tunnels, cuttings or bridgework over 72 per cent of the length. The combined cost of the two lines was estimated at $A5.9 billion in 1984. A further 3000 kilometres of existing line is earmarked for upgradng to the standard of the new lines, in which case the ICE will operate alongside conventional traffic. The maximum speed on the new lines will be 250 kilometres per hour, although the ICEs themselves are capable of 350 kilometres per hour.

The Japanese Shinkansen, now in operation for more than 20 years is introducing a new generation of train sets, and planning to expand its 1834 kilometre network. The maximum operating speeds vary between 210 and 240 kilometres per hour, depending upon the line. Introduction of the Shinkansen Series 100 train sets in 1986 offers the possibility of 260 kilometres per hour travel on certain lines with signal upgrading. Further advances in train technology through a Series 300 are envisaged by the 1990s, allowing a maximum speed of 300 kilometres per hour. In addition to the four existing Shinkansen lines, two further lines are presently under construction. These involve an extension to the Tohoku line from Morioka to Aomori, and construction of the Hokuriku line from Takasaki to Komatsu. The Tohoku line extension will link up with the recently opened Seikan Tunnel that connects the main island of Honshu to the northern island of Hakkaido. Four other Shinkansen lines are also planned to extend the network the length of

Japan, although their future will depend upon the early performance of the country's new Japan Railways Group.

The foregoing section gives a brief account of the major operating high speed systems. The nature and cost of each system varies greatly, depending upon the level of technology used and the physical terrain traversed. A relatively high level of investment has been required in the Japan and the FRG high speed systems, as a large proportion of tunnelling and bridging has been necessary. The paths of the TGV and the relaxation on gradient restrictions has not required the same degree of heavy engineering with the French high speed system. In Australia, a Very Fast Train (VFT) has been proposed with a new route linking Sydney, Canberra and Melbourne. A feasibility study has been funded by joint venturers in the VFT project (several large private companies) to examine the proposal which features new technology electric traction trains capable of 350 kilometre per hour speeds. The route design would minimise horizontal curves to sustain high average speeds, but would allow relatively steep gradients (hence lower track construction costs) to utilise the momentum generated by the high speeds. The proponents of the scheme claim that the VFT could be operational by 1995.

To be viable, however, high speed trains need to operate in densely populated corridors with sufficient scope to attract high levels of patronage. In the US, high speed railway projects are being considered viable propositions for a number of inter-city corridors, such as Detroit-Chicago, Las Vegas-Los Angeles, Philadelphia-Pittsburgh, and so on (Freeman Allen 1988).

Magnetic levitation

Taking high speed railway technology a step further is the magnetically levitated train, commonly known as the maglev.

Maglev technologies are often termed 'flying trains' since the trains do not have contact with a surface, and combine the high speeds of aircraft and the fixed guideways of trains. The main difference between maglev and conventional high speed railway technology is that the speeds achievable by maglev are somewhat greater than with wheel-on-rail technology.

There are two different maglev technologies currently being developed. Both technologies are capable of speeds of 400 kilometres per hour, and are mainly for inter-city passenger services. The two major countries involved in the maglev technologies are the FRG and Japan.

The FRG is concentrating on the maglev attraction technology which employs conventional iron-core electromagnets, while Japan is developing the repulsion maglev technology which employs super conducting magnets. The attraction maglev system floats about 1 centimetre from the guideway surface and can levitate at any speed. The system requires electronic sensing of the gap and continuous control of the magetic current to achieve stable levitation. The repulsion system floats about 10 centimetres from the guideway, but only works after sufficient forward velocity has been generated to achieve electrodynamic levitation. Consequently, the system requires auxiliary wheels for support at low speeds.

The two systems rely on electromagnetic force to provide levitation, lateral guidance, propulsion and braking, without direct physical contact between the vehicle and the guideway.

The operating costs for maglev system have been estimated to be lower than those of a conventional high speed railways, although construction costs of maglev guideways are claimed to be much higher than for conventional rails. Maglev is designed to be competitive with air travel from station to station on routes with high population densities.

Reported advantages of the maglev system include:

- low maintenance costs (track and vehicle repair), due to the low guideway loading and freedom from mechanical contact;
- high speed, leading to improved productivity;
- enhanced safety, as derailment is theoretically impossible;
- low vibration and noise; and
- low sensitivity to weather conditions, owing to elimination of mechanical contact between the guideway and the vehicle (Office of Technology Assessment 1983).

Substantial technical development and testing is currently proceeding in both technologies.

Signalling and Communications

The majority of the railway systems have adopted some form of updated communication and signalling equipment. Manual signal boxes have largely been replaced by computer signalling centres, and railways generally have adopted centralised traffic control to eliminate multiple control centres. In addition, communications systems are

currently being computerised, facilitating surveillance of train operations, routes and speeds. The computerisation of such networks has invariably meant reductions in the workforce and contributed to the overall decline in staffing levels.

Proposed innovations in this area take the form of increased usage of satellites. SNCF is currently engaged in developing a new method of train control referred to as Astree, an acronym for Automatisation du Suivi en Temps Reel. The aim is to take advantage of advances in computers and communications in order to reduce costs, improve performance, and increase safety.

Astree is proposed to achieve the following:

- to centralise knowledge of railway movements;
- based on this increased knowledge, to use data processing to make, or to assist in operating decisions;
- whenever possible, to rely on mobile, rather than wayside, equipment, in order to reduce costs and provide uniform levels of service and safety; and
- to make use of public communications facilities in addition to those owned and operated by the railways.

Astree's main building blocks are continuous and autonomous train position monitoring, a communications capability between trains and control centres, a distributed database and computer based train control applications. These are completed by two support functions: train integrity checking or in-train communications and point monitoring (Bernard 1986).

Astree is considered as a favoured option in improving train-to-ground communications, as it overcomes certain disadvantages related to cellular networks, such as, limited coverage, susceptibility to vandal attack and potential network breakdown.

In North America, another communication system is being developed based on similar principles to those of Astree. It is referred to as the Advanced Train Control Systems (ATCS). This system is a 'distributed function' combining one central computer at the dispatch office and computers on board each lead locomotive (Detmold 1986). All decisions concerning more than one train will be taken with the support of the central computer. The ATCS is considered to be far less demanding than a totally centralised system. Further, the system can tolerate a brief failure at the centre without total dislocation, as each train can safely execute remaining movement authorities issued to it.

Most North American railways that are participating in the project are keen to instal the systems as soon as specification, testing and design review processes are completed. It is envisaged to provide substantial improvements in safety and also to provide the opportunity to implement operating plans more precisely and cost-effectively than at present.

SUMMARY

Railway reforms have attempted to change the essentially conservative outlook and orientation of railways, to meet the demands made in a competitive transport environment. Railway management has been required to reassess their social and economic position. This reassessment by a number of railway systems has led to a number of changes. Contraction in the physical size of the systems has been one response. Within this, however, Japanese and European railways have identified demand niches such as high speed passenger railway services as commercial operations capable of further expansion. The bottom line in the value of these attempts at railway reform is the effect upon railway performance. The next chapter examines this issue and provides an analysis of the financial and productivity performance of selected railways since the early 1980s.

CHAPTER 4 RAILWAY PERFORMANCE

During the 1970s, governments and management became increasingly aware of an alarming decline in the railway industry not only in Australia, but also overseas (Holthuyzen 1987). Both in financial and purely operational terms, railways performed poorly. The major reasons for this included national economic performance, political constraints, economic regulation, rigid management structures, overmanning and outdated technology, the effects of which were exacerbated by a highly competitive (and often subsidised) road transport industry (Dempsey 1988; IRJ 1986; ARRDO 1981; Goldschmidt 1981).

Consequently, a number of measures were initiated to help the railways recover their position. These included institutional and regulatory rearrangements, organisational restructuring, rationalisation and the adoption of new technologies and more commercial approaches to business where possible. This chapter examines rail performance in a number of countries where changes have been initiated, and deals with both financial and operational indicators to reflect the effects of these changes.

It should be borne in mind that some of the countries examined here had initiated major institutional and organisational changes in their railway industries well before the period under study (notably Canada and the US). However Japan has yet to fully implement its proposed changes. Consequently, even allowing for lag time, it can be expected that most changes will be observed in countries whose railways are in the process of being restructured.

FINANCIAL INDICATORS

The financial performance of the railway systems under review in this study can be measured in terms of[1]:

- operating revenue
- operating expenditure
- operating income
- government contributions.

The analysis in this section shows that in purely financial terms, the performances of railway systems have not followed a common direction in the early 1980s.

The financial results reported here are presented in terms of the respective currencies of the countries concerned; that is, dollars (Australia, Canada, NZ and US), deutschmarks (FRG), francs (France), yen (Japan) and pounds (UK). This has been done to avoid the effects of exchange rate fluctuations, that would have occurred if local currencies had been converted into any one currency only. Hence, comparisons will focus on internal trends, rather than on absolute differences between countries.

Table 4.1 shows that passenger revenues fluctuated greatly in the first half of the 1980s. Despite an economic downturn during 1982-83 (State of Play 4 1986) and generally falling passenger kilometres, revenues have not uniformly declined over the same period, as would be expected. For example, SNCF achieved a 34 per cent rise in passenger revenue in the 1981 to 1985 period, while neighbouring Germany's DB experienced a 27 per cent fall in passenger revenue. However, while these contrasting results can be attributed to rises and falls in passenger traffic and increases in French tariffs (SNCF 1984), Australia, Canada and Japan showed increased passenger revenues in real terms, despite substantial declines in passenger kilometres (see Table 4.2). At least in Canada, this result can be attributed to fare increases, innovative fare structures and shorter average journeys (VIA 1985).

Table 4.2 demonstrates that the general downturn in net tonne-kilometres between 1981 and 1983, evident from Table 3.3, is parallelled by an almost across-the-board decline in rail freight revenue. Only Australia was an exception in this context. Moreover, the general fall in revenue during the 1981 to 1983 period continued until 1985 for SNCF, NZR, BR, JNR and the US Class I railroads. While NZR and JNR lost about 25 per cent of their freight revenue between 1983 and 1985, Australia and Canada, recovered to surpass their 1981 revenue positions.

In the US, Class I railroad freight business also increased in the early 1980s. Nevertheless, real revenue continued to decline. The Association of American Railroads (AAR) attributed this trend to the railroads' desire to improve their competitive position in the largely deregulated era following the Staggers Act of 1980, pointing out that, in constant dollar terms, railroad freight rates as a whole had declined between 1981 and 1985 to regain lost business (Blanchette 1987). Similar commercial flexibility was sought by NZR late in 1984.

TABLE 4.1 NON-URBAN RAIL PASSENGER REVENUE, SELECTED YEARS (CONSTANT 1986 PRICES)

(million)

Country	*Unit*	*1981*	*1983*	*1985*
Australia	$A	160.3	172.6	173.8
Canada[a]	$C	207.6	188.9	207.4
FRG[b]	DM	6 733.8	4 943.3	4 921.3
France	F	15 372.0	24 881.5	20 582.1
Japan[c]	Y	2 064 000.0	2 148 484.5	2 424 347.4
NZ	$NZ	14.2	14.2	11.6
UK		1 323.8	1 310.4	1 379.8
US[d]	US$	567.8	588.7	627.7

a. VIA Rail only.
b. Includes surburban services.
c. JNR only.
d. Amtrak only.

Sources Derived from AAR (1987). Amtrak (1981). AN (1981, 1985). CN (1981, 1986). Conrail (1981, 1985). CP (1983, 1985). DB (1981, 1985). Department of Transport, Great Britain (1987). JNR (1986). NZR (1986). OECD (1987). QR (1985). SNCF (1981, 1983, 1985). SRA (1981, 1985). STA (1985). VIA (1986). VRB (1981). Westrail (1985).

Some problems were experienced in implementating deregulated freight rates, resulting in an initial revenue loss; but management remained convinced of the long-term commercial viability of the new rates (NZR 1986).

Railway managements were expected to reduce expenditure as part of the new institutional arrangements, and to achieve an operating result which would require no subsidies outside the explicitly agreed upon equalisation, and compensatory payments, or revenue supplements provided by governments. In practical terms this meant increasing revenues and reducing expenses. Table 4.3 shows the levels of operative revenue and expenditure achieved between 1981 and 1985.

TABLE 4.2 RAIL FREIGHT REVENUE, SELECTED YEARS (CONSTANT 1986 PRICES)
(million)

Country	*Unit*	*1981*	*1983*	*1985*
Australia	$A	1 742.1	1 768.1	2 226.1
Canada[a]	$C	6 081.6	5 585.9	6 150.2
FRG	DM	10 690.6	8 777.1	8 911.6
France	F	24 009.6	22 141.9	20 114.9
Japan	Y	334 755.0	252 609.0	189 878.3
NZ	$NZ	590.3	570.1	149.7
UK		812.0	733.7	677.9
US[a]	US$	35 086.5	28 496.6	27 421.6

a. Class I freight railroads only.

Sources Derived from AAR (1987). Amtrak (1981). AN (1981, 1985). CN (1981, 1986). Conrail (1981, 1985). CP (1983, 1985). DB (1981, 1985). Department of Transport, Great Britain (1987). JNR (1986). NZR (1986). OECD (1987). QR (1985). SNCF (1981, 1985). SRA (1981, 1985). STA (1985). VIA (1986). VRB (1981). Westrail (1985).

Table 4.3 shows a clear pattern. Growing revenue is parallelled by growing expenditure in the case of Australia and Japan, while declining revenue is matched by declining expenditure in the US and France. Canada's and NZ's expenditures actually grew while revenues fell, and only in the FRG and UK between 1983 and 1985 did expenditure decline while revenue rose.

Table 4.3 shows little evidence of the desired relationship between revenue and expenditure, a result which is reflected by the operating income figures, contained in Table 4.4. Despite general rationalisation, the drive to shed excess capacity and labour and increased commercial freedom, only the predominantly private railroads of the US show a positive return on their operations. Indeed, France and NZ experienced consistently increasing operating deficits between 1981 and 1985, suggesting either mounting inefficiencies and deteriorating productivity, and/or major increases in labour rates, and fuel and other materials prices.

TABLE 4.3 TOTAL OPERATING REVENUE AND EXPENDITURE, SELECTED YEARS (CONSTANT 1986 PRICES)

(million)

Country	*Unit*	*1981*	*1983*	*1985*
Australia	$A	1 902.5	1 903.8	2 400.0
		(2 939.2)	(3 018.7)	(3 113.1)
Canada[a]	$C	6 278.0	5 775.0	6 365.7
		(6 335.0)	(6 929.2)	(7 357.9)
FRG[b]	DM	17 424.4	13 720.5	13 832.9
		(31 657.6)	(29 024.7)	(28 025.1)
France	F	39 381.6	47 023.0	40 697.0
		(53 761.0)	(66 277.3)	(62 863.5)
Japan[c]	Y	2 398 755.0	2 401 093.0	2 614 225.8
		(3 516 432.5)	(3 698 446.8)	(3 799 610.0)
NZ	$NZ	604.6	584.3	431.3
		(719.3)	(738.6)	(690.7)
UK	£UK	2 135.8	2 044.1	2 057.7
		(3 007.3)	(2 903.1)	(2 803.3)
US[a]	US$	35 654.3	29 063.3	28 349.3
		(34 675.9)	(26 589.2)	(25 919.0)

a. All Class I railroads.
b. Includes suburban services.
c. JNR only.

Note Figures in parentheses denote expenditure.

Sources Derived from AAR (1987). Amtrak (1981). AN (1981, 1985). CN (1981, 1986). Conrail (1981, 1985). CP (1983, 1985). DB (1981, 1985). Department of Transport, Great Britain (1987). JNR (1986). NZR (1986). OECD (1987). QR (1985). SNCF(1981, 1985). SRA (1981, 1985). STA (1985). VIA (1986). VRB (1981). Westrail (1985).

Even when government contributions to operating revenues are considered, the pattern of deficits changes little, other than in magnitude. Table 4.5 shows that equalisation and compensatory payments, as well as revenue supplements and contributions to welfare and pension schemes, had been falling in real terms in the early 1980s, except for some fluctuations in Australia, France and the UK. This, combined with already substantial operating losses, still left most railway systems well short of a break even point.

TABLE 4.4 RAIL OPERATING INCOME, SELECTED YEARS (CONSTANT 1986 PRICES)

(million)

Country	*Unit*	*1981*	*1983*	*1985*
Australia	$A	(1 036.7)	(1 114.9)	(713.1)
Canada[a]	$C	(45.8)	(1 154.2)	(1 000.3)
FRG[b]	DM	(14 233.2)	(15 304.2)	(14 219.2)
France	F	(14 379.4)	(19 254.3)	(22 166.5)
Japan	Y	(1 117 677.5)	(1 297 353.8)	(1 185 384.2)
NZ	$NZ	(114.7)	(154.3)	(259.4)
UK	£UK	(871.5)	(859.0)	(745.6)
US[a]	US$	978.4	2 474.1	2 430.3

a. All Class I railroads.
b. Includes suburban services.

Note Figures in parentheses denote operating losses.

Sources Derived from AAR (1987). Amtrak (1981). AN (1981, 1985). CN (1981, 1986). Conrail (1981, 1985). CP (1983, 1985). DB (1981, 1985). Department of Transport, Great Britain (1987). JNR (1986). NZR (1986). OECD (1987). QR (1985). SNCF (1981, 1985). SRA (1981, 1985). STA (1985). VIA (1986). VRB (1981). Westrail (1985).

OPERATIONAL INDICATORS

To illustrate movements in productivity levels, operational indicators such as labour and track productivity have been chosen partly for their relative simplicity and partly because more detailed and consistent data are unavailable.

Table 4.6 presents non-urban passenger and tonne-kilometres performed per railway employee. On the basis of these figures, it is not difficult to distinguish those countries where freight traffic dominates the railways' task - Australia, Canada, NZ and the US. In addition, however, the table shows a general increase in employee productivity over the 1981 to 1985 period, especially in terms of tonne-kilometres performed. Notable exceptions are France and Japan, which show marked rises in passenger-kilometres performed per employee.

It should be noted, that the passenger productivity figures for both Canada and the US are based on the numbers of employees solely engaged

TABLE 4.5. EXPLICIT GOVERNMENT CONTRIBUTIONS TO RAILWAY OPERATIONS, SELECTED YEARS (CONSTANT 1986 PRICES)
(million)

Country	*Unit*	*1981*	*1983*	*1985*
Australia[a]	$A	649.5	741.3	498.1
Canada[b]	$C	908.9	849.3	na
FRG	DM	8 906.5	8 532.5	8 240.0
France	F	14 509.7	15 934.6	15 440.3
Japan	Y	368 510.0	353 861.8	247 649.5
NZ	$NZ	na	129.0	78.3
UK	£UK	1 039.5	1 064.1	927.3
US[c]	US$	891.6	772.1	632.9

a. Contributions by Commonwealth Government to AN; State government contributions to respective State railways.
b. Federal Government contributions only; includes small proportion for provincial railways.
c. Amtrak only.
na Not available.

Sources Derived from AAR (1987). Amtrak (1981). AN (1981, 1985). CN (1981, 1986). Conrail (1981, 1985). CP (1983, 1985). DB (1981, 1985). Department of Transport, Great Britain (1987). JNR (1986). NZR (1986). OECD (1987). QR (1985). SNCF (1981, 1985). SRA (1981, 1985). STA (1985). VIA (1986). VRB (1981). Westrail (1985).

in passenger operations within VIA Rail and Amtrak, whereas results for other countries take into account the whole workforce. As was pointed out earlier, VIA Rail and Amtrak rely on freight railway facilities and personnel to a large extent, therefore requiring a smaller workforce themselves and inflating passenger productivity figures. The table shows that when some CP and CN employees are transferred to VIA Rail, labour productivity correspondingly drops.

One of the objectives of railway restructuring was to reduce expenditure. However, Table 4.7 illustrates not only that, except for the US, expenditure greatly exceeded revenue, but also that movements in revenues generated per employee were closely parallelled by changes in expenditure levels. This, taken together with the data contained in the previous table, suggests that the greater revenues resulting from improved labour productivity, are easily neutralised by associated increases in operating costs. Why this should be so, is not clear. It indicates, however, that during the first half of the

1980s, the railways had not yet achieved their objective of containing their costs.

The density of railway traffic and, track productivity, are presented in Table 4.8, expressed in terms of non-urban passenger and tonne kilometres performed per kilometre of track. It is apparent that not only did some countries have widely varying passenger and freight traffic densities on their individual track networks, but also that there was a wide variation of track usage among countries. For example, low density passenger traffic in Australia, Canada, NZ and the US contrasted with the high density traffic of Japan and France. On the other hand, high density freight networks operated in Canada, the US and, to a lesser extent, in France and Japan.

TABLE 4.6 NON-URBAN PASSENGER AND TONNE-KILOMETRES PERFORMED PER RAILWAY EMPLOYEE, SELECTED YEARS

('000)

Country	*1981*	*1983*	*1985*
Australia			
Passenger-km[a]	0.1	0.1	0.1
Tonne-km	333.2	325.2[b]	426.9
Canada			
Passenger-km[c]	728.2	619.2	594.3
Tonne-km[d]	2 252.9	2 713.8	2 612.4
FRG			
Passenger-km	107.1	100.7	114.7
Tonne-km	187.4	197.2	213.5
France			
Passenger-km	193.2	201.5	223.2
Tonne-km	258.0	236.8	244.5
Japan			
Passenger-km	205.6	314.8	314.6
Tonne-km	83.2	75.5	78.0
NZ			
Passenger-km[f]	0.0	0.0	0.0
Tonne-km	156.7	173.3	185.5

TABLE 4.6 (Cont.) NON-URBAN PASSENGER AND TONNE-KILOMETRES PERFORMED PER RAILWAY EMPLOYEE, SELECTED YEARS
('000)

Country	*1981*	*1983*	*1985*
UK			
Passenger-km	144.9	163.9	176.7
Tonne-km	85.4	93.4	91.0
US			
Passenger-km[g]	366.7	356.2	363.0
Tonne-km[h]	3 045.0	3 755.2	4 241.4

a. Passenger journeys.
b. Estimate.
c. VIA Rail only.
d. CN and CP.
f. 8.6, 9.8 and 12.5 passenger-kilometres, respectively.
g. Amtrak only.
h. Class I freight railroads.

Sources Derived from AAR (1987). Amtrak (1981). AN (1981, 1985). CN (1981, 1986). Conrail (1981, 1985). CP (1983, 1985). DB (1981, 1985). Department of Transport, Great Britain (1987). JNR (1986). NZR (1986). QR (1985). SNCF (1981, 1985). SRA (1981, 1985). STA (1985). VIA (1986). VRB (1981). Westrail (1985).

Table 4.8 shows that some countries exploited available track capacity more than others. However, there was no discernable trend of increased track utilisation within countries. Passenger traffic density increased in France, the FRG, UK and US, but declined in Australia and Japan. Freight traffic density, on the other hand, grew in Australia, the FRG and US, but fell in France, Japan and the UK.

Table 4.9 presents the levels of total revenue generated and expenditure incurred per kilometre of track between 1981 and 1985. Again, only the US could show that its Class I railroads (including Amtrak) operated profitably on this basis, probably reflecting the inherently more productive nature of the freight task. For other countries, however, there was some tendency for expenditure to rise and fall relative to revenue movements. In effect, the revenue gains resulting from increased track productivity were thus nullified by a parallel growth in costs.

TABLE 4.7 OPERATING REVENUE AND EXPENDITURE PER RAILWAY EMPLOYEE, SELECTED YEARS (CONSTANT 1986 PRICES)
('000)

Country	*Unit*	*1981*	*1983*	*1985*
Australia	$A			
Revenue		17.4	18.3	22.9
Expenditure		26.8	28.5	29.6
Canada[a]	$C			
Revenue		49.8	68.3	68.4
Expenditure		58.6	82.0	79.1
FRG[b]	DM			
Revenue		53.6	44.7	46.9
Expenditure		97.4	94.5	95.1
France	F			
Revenue		158.2	187.2	170.4
Expenditure		215.9	263.8	263.2
Japan[c]	Y			
Revenue		5 997.5	6 670.0	9 336.5
Expenditure		8 791.1	10 273.5	13 570.0
NZ	$NZ			
Revenue		29.3	31.6	24.2
Expenditure		34.9	39.9	38.8
UK	£UK			
Revenue		10.4	11.2	12.2
Expenditure		14.7	15.9	16.7
US[a]	US$			
Revenue		78.0	85.1	87.9
Expenditure		75.9	77.9	80.0

a. All Class I railroads.
b. Includes suburban services.
c. JNR only.

Sources Derived from AAR (1987). Amtrak (1981). AN (1981, 1985). CN (1981, 1986). Conrail (1981, 1985). CP (1983, 1985). DB (1981, 1985). Department of Transport, Great Britain (1987). JNR (1986). NZR (1986). OECD (1987). QR (1985). SNCF (1981, 1985). SRA (1981, 1985). STA (1985). VIA (1986). VRB (1981). Westrail (1985).

To summarize, on the basis of the financial and operational indicators presented in this chapter, there is no clear evidence that the performance objectives established to revitalise ailing railway systems have been consistently achieved.

TABLE 4.8 NON-URBAN PASSENGER AND TONNE-KILOMETRES PERFORMED PER KILOMETRE OF TRACK, SELECTED YEARS

('000)

Country	*1981*	*1983*	*1985*
Australia[a]			
Passenger-km[b]	0.3	0.3	0.2
Tonne-km	857.4	791.2[c]	1000.8
Canada			
Passenger-km[d]	na	24.1	na
Tonne-km[f]	na	2 198.2	na
FRG			
Passenger-km	531.4	483.9	533.9
Tonne-km	929.4	939.4	993.9
France			
Passenger-km	1 390.2	1 451.6	1 531.0
Tonne-km	1 856.6	1 714.6	1 682.1
Japan			
Passenger-km	5 755.0	5 635.0	5 685.0
Tonne-km	1 568.1	1 266.4	1 024.8
NZ[a]			
Passenger-km	0.05	na	0.05
Tonne-km	0.7	0.7	0.7
UK			
Passenger-km	694.6	714.3	753.8
Tonne-km	408.9	414.0	388.3

TABLE 4.8 (Cont.) NON-URBAN PASSENGER AND TONNE-KILOMETRES PERFORMED PER KILOMETRE OF TRACK, SELECTED YEARS
('000)

Country	*1981*	*1983*	*1985*
US			
Passenger-km[g]	17.5	16.8	20.7
Tonne-km[h]	2 894.5	2 921.0	3 308.5

a. Route length.
b. Journeys.
c. Estimate.
d. VIA Rail only.
f. CN and CP.
g. Amtrak only.
h. Class I freight railroads.
na Not available.

Sources Derived from AAR (1987). Amtrak (1981). AN (1981, 1985). CN (1981, 1986). Conrail (1981, 1985). CP (1983, 1985). DB (1981, 1985). Department of Transport, Great Britain (1987). JNR (1986). NZR (1986). OECD (1987). QR (1985). SNCF (1981, 1985). SRA (1981, 1985). STA (1985). VIA (1986). VRB (1981). Westrail (1985).

TABLE 4.9. OPERATING REVENUE AND EXPENDITURE PER KILOMETRE OF TRACK, SELECTED YEARS (CONSTANT 1986 PRICES)
('000)

Country	*Unit*	*1981*	*1983*	*1985*
Australia[a]	$A			
Revenue		44.7	43.7	53.6
Expenditure		69.0	69.3	69.5
Canada	$C			
Revenue		na	58.1	na
Expenditure		na	69.7	na
FRG	DM			
Revenue		266.0	212.6	218.6
Expenditure		483.3	449.8	443.4
France	F			
Revenue		1 138.3	1 354.7	1 173.6
Expenditure		1 554.0	1 909.5	1 812.9
Japan	Y			
Revenue		112 501.0	112 268.0	123 949.0
Expenditure		164 492.0	172 929.0	180 153.0
NZ[a]	$NZ			
Revenue		13.7	na	14.4
Expenditure		16.3	17.0	16.2
UK	£UK			
Revenue		49.9	49.5	52.2
Expenditure		70.3	70.3	71.1
US	US$			
Revenue		83.3	70.2	73.1
Expenditure		81.0	64.2	66.9

a. Route length.
na Not available.

Sources Derived from AAR (1987). Amtrak (1981). AN (1981, 1985). CN (1981, 1986). Conrail (1981, 1985). CP (1983, 1985). DB (1981, 1985). Department of Transport, Great Britain (1987). JNR (1986). NZR (1986). OECD (1987). QR (1985). SNCF (1981, 1985). SRA (1981, 1985). STA (1985). VIA (1986). VRB (1981). Westrail (1985).

CHAPTER 5 CONCLUDING REMARKS

This study has shown that, although playing a less dominant transport role than in the past, railways nevertheless occupy a significant place in the economy. It is also apparent that governments see the preservation of railways to be in the public interest, not so much as institutions, but rather as successful government business enterprises or viable, privately-owned undertakings.

A number of common threads run through recent overseas railways restructuring and reorganisation. Apart from fundamental institutional changes like privatisation of public corporations or the government takeover of bankrupt companies, less spectacular changes in the transport environment and in government and management conduct have been regarded as alternative contributions to the revitalisation of railways.

In general, changes in the industry have addressed four interrelated objectives:

- rationalisation
- commercialisation
- more flexible management practices
- transparent accounting (see Haase and Siebert 1986).

Rationalisation has usually referred to cut-backs in staffing, reductions (and some replacement) of tractive and rollingstock, and contraction of the track network. Some countries appear to have been more successful in this exercise than others. It was difficult, however, to establish what original rationalisation targets were, and how much political considerations have masked genuine attempts to re-organise the railways' productivity (see, for example, Der Spiegel 1984).

Most of the overseas railway systems studied, have been relieved of the institutional straight jackets into which they have been forced, either by political masters, or by statutory regulating authorities.

The drive towards commercialisation of railway activities has invariably been accompanied by greater managerial discretion and accountability. In addition, improved accounting practices allowed for the separation of commercial operations from welfare commitments and infrastructure expenditure. These developments have led to a clearer assignation of responsibility, for example, of government responsibilities to the two railways SNCF and DB.

In some countries, these changes in the railway industry have been in place longer than elsewhere; indeed, in Australia, railway systems like AN and Westrail appear to have stolen a march on the rest of the States' railways. However, while the image of overseas rail systems may have improved as a result of restructuring, more aggressive and competitive marketing, investment in highly visible technologies like high-speed rail and their perceived value as an environmentally sound alternative to road transport, their performance, in general, has not kept pace. A notable exception is the (privately-owned) rail freight business in the US, which has largely been stripped of its regulatory shackles and has been allowed to recover from near extinction (Blanchette 1987).

There are several reasons why positive results of change are often not instantaneously available to encourage similar efforts in other countries. One of these reasons is that changing an 'institution' is by definition a slow process, given entrenched attitudes and traditional expectations. This resistance to change is fortunately being overcome, even among the most institutionalised railway organisations.

In Australia, the railway systems have evolved as five separate government operations, with a legacy of non-uniform standards. This has made the task of restructuring and reorganisation towards a national objective especially difficult. Various gauge standardisation proposals and programs have been taking place for many years, and more recently ROA has worked on the co-ordination of intersystem activities. However, these initiatives have not been enough, particularly in the rapidly changing land transport environment of the 1980s.

Reformation of Australian railways is now taking place to assist in their survival into the next century, citing the Railway Industry Council work as an example of the more recent initiatives undertaken. As in other countries, Australian railways occupy a significant place in the economy, particularly as carriers of Australian domestic and export freight. If Australian railways can learn from mistakes or benefit from advice provided by overseas experience, they are well placed to advance as a viable mode of transport.

REFERENCES

AAR. *See* Association of American Railroads.

ABS. *See* Australian Bureau of Statistics.

Affleck, F. (1978), *The Economic Regulation of Road Haulage in Western Australia from the 1920s to the 1970s*, Policy Research Paper No 4, Director General of Transport.

Amtrak. *See* National Railroad Passenger Corporation.

AN. *See* Australian National Railways Commission.

ARRDO. *See* Australian Railway Research and Development Organisation.

Association of American Railroads (1987), *Railroad Facts 1987 Edition*, Washington DC.

Australian Bureau of Statistics (1986a), *1984 Household Expenditure Survey, Australia, Detailed Expenditure Items*, Cat. No. 6535.0, Canberra.

__ (1986b), *Transportation Establishments: Summary of Operations by Industry Class, Australia and States 1983-84*, Cat. No. 9103.0, Canberra.

__ (1987), *Australian National Accounts, Estimates of Capital Stock 1985-86*, Cat. No. 5221.0, Canberra.

Australian National Railways Commission (1981), *Annual Report 1980-81*, Keswick, South Australia.

__ (1985), *Annual Report 1984-85*, Keswick, South Australia.

Australian Railway Research and Development Organisation (1981), *1981 Report on Rail*, ARRDO, Melbourne.

BTE. *See* Bureau of Transport Economics.

Bernard, P. H. (1986), Astree takes shape, *IRJ, August 1986*, 20-22.

Blainey, G. (1966), *The Tyranny of Distance. How Distance Shaped Australia's History*, Sun Books, Melbourne.

Blanchette, R. W. (1987), *America's Railroads after Staggers: An Economic Prospectus*, American Association of Railroads, Washington DC.

Bureau of Transport Economics (1987a), *The Transport Sector in the Australian Economy*, Information Paper 22, AGPS, Canberra.

__ (1987b), *Assessment of the Australian Road System: 1987*, Report 61, AGPS, Canberra.

Butlin, N. G., Barnard, A. & Pincus, J. J. (1982), *Government and Capitalism: Public and Private Choice in Twentieth Century Australia*, George Allen & Unwin, Sydney.

Canadian National (1981), *Annual Report 1981*, Montreal.

__ (1986), *Annual Report 1986*, Montreal.

Canadian Pacific Limited (1983), *Annual Report 1983*, Montreal.

__ (1985), *Annual Report 1985*, Montreal.

Canadian Transport Commission (1985), *Transport Review, Trends and Selected Issues 1985*, Ottawa.

__ (1987), *The Twenty-first Annual Report 1987*, Ottawa.

Carroll, B. (1976), *Australia's Railway Days: Milestones in Railway History*.

Central Statistical Office, Great Britain (1986), *United Kingdom National Accounts 1986 Edition*, HMSO, London.

CN. *See* Canadian National Railways.

Conrail. *See* Consolidated Railroad Corporation.

Consolidated Railroad Corporation (1981), *Annual Report 1981*, Washington DC.

__ (1985), *Annual Report 1985*, Washington DC.

CP. *See* Canadian Pacific Limited.

CTC. *See* Canadian Transport Commission.

DB. *See* Deutsche Bundesbahn.

Dempsey, W. H. (1988), *Container News*, February 1988.

Department of Transport (1987), *Annual Report 1986-87*, AGPS, Canberra.

Department of Transport and Communications (1987), *Commuter Air Transport 1984-85*, DoTC, Canberra.

__ (1988), *Provisional Statistics of Domestic Scheduled Airline Performance*, March Quarter 1988, DoTC, Canberra.

Department of Transport, Great Britain (1987), *Transport Statistics, Great Britain 1976-1986*, HMSO, London.

Der Spiegel (1984), *Mit Tempo 250 in ein neues Zeitalter*, Nr. 43, 69-85.

Detmold, P. J. (1986), ATCS on-line by 1988, *IRJ, August 1986*, 18-19.

Deutsche Bundesbahn (1981), *Geschaftbericht der Deutschen Bundesbahn, Geschaftsjahr 1981*, Frankfurt.

__ (1985), *Geschaftsbericht der Deutschen Bundesbahn, Geschaftsjahr 1985*, Frankfurt.

DoT. *See* Department of Transport.

DoTC. *See* Department of Transport and Communications.

Freeman Allen, G. (1988), *Jane's World Railways 1987-88*, Jane's Transport Press, London.

Gohlke, R. (1980), High investment needed if DB is to be competitive, *IRJ, January 1980.*

Goldschmidt, N. (1981), The United States' rail industry partnership, Editorial, *Rail International, April 1981*, 149-154.

Grimm, C. M. & Harris, R. G. (1983), Structural economics of the U.S. rail freight industry: concepts, evidence, and merger policy implications, *Transportation Research-A*, Vol. 17A, No. 4, 271-281, 1983.

Grimm, C. M., Kling, J.A. & Smith, K. G. (1987), The impact of U.S. rail regulatory reform on railroad management and organisational structure, *Transportation Research-A*, Vol. 21A, No. 2, 87-94, 1987.

Haase, D. & Siebert, J. (1986), Comparison of the corporate plans of certain European Railways, *Rail International, June 1986*, 41-45.

Heinisch, R. (1986), Operators' Possibilities and Constraints: The German Network, in *European Dimension and Future Prospects of the Railways*, Report of an International Seminar held in Paris, European Conference of Ministers of Transport, Paris.

Holthuyzen, F. (1987), The Finances and Performance of Australia's Rail Systems, Paper presented at 12th Australian Transport Research Forum, Brisbane, July, *Forum Papers*, Vol. 1.

IRJ. *See* International Railway Journal.

International Railway Journal (1983), Gohlke aims to increase revenue and trim capacity (IRJ interview with Dr R. Gohlke), *IRJ, September 1983.*

__ (1986), JNR Gets the Kiss of Life, *IRJ*, 26(11), 14-35.

Japanese National Railways (1986), *1986 Edition Facts and Figures*, Tokyo.

JNR. *See* Japanese National Railways.

Lotz, J. (1988), Loyalty, Lucy Ships and Free Spirits, in *Transpo 88*, Vol. 11, Transport Canada, Ottawa.

McDonnell, G. (1980), *Report of the Commission of Enquiry into the N.S.W. Road Freight Industry*, Government Printer, Sydney.

National Railroad Passenger Corporation (1981), *1981 Annual Report*, Washington DC.

New Zealand Department of Statistics (1986a), *New Zealand Household Expenditure and Income Survey 1985-86*, Wellington.

__ (1986b), *New Zealand Business Pattern 1986*, Information Release, Cat. No. 01.502, Wellington.

__ (1986c), *Monthly Abstract of Statistics*, June, Wellington.

New Zealand Railways Corporation (1986), *Report of the New Zealand Railways Corporation for the year ended 31 March 1986*, and earlier years including Reports of the Railways Department, Government Printer, Wellington.

NZ. *See* New Zealand.

NZR. *See* New Zealand Railways Corporation.

OECD. *See* Organisation for Economic Co-operation and Development.

Organisation for Economic Co-operation and Development (1987), *OECD Economic Outlook 42, December 1987*, Paris.

Office of Technology Assessment (1983), *U.S. Passenger Rail Technologies*, U.S. Congress, Washington DC.

QR. *See* Queensland Railways.

Queensland Railways (1985), *1985 Queensland Railways Annual Report, for year ended 30th June 1985*, and earlier years, Government Printer, Brisbane.

Rockey, C. F. (1987), The formation of regional railroads in the United States, *Transporation Journal Winter 1987*, Vol. 27 No. 2, 5-13.

SNCF. *See* Societe Nationale des Chemins de Fer Francais.

Societe Nationale des Chemins de Fer Francais (1981), *Rapport D'Activite 1981*, Paris.

__ (1983), *Rapport D'Activite 1983*, Paris.

__ (1984), *SNCF in 1983*, Paris.

__ (1985), *Rapport D'Activite 1985*, Paris.

Statistics Bureau, Japan (1987), *Japan Statistical Yearbook 1987*, Management and Coordination Agency, Tokyo.

Statistics Canada (1985), *National Income and Expenditure Accounts 1970-1984*, Cat. No. 13-201, Ottawa.

__ (1986), *Canadian Railways, 1985*, Ottawa.

__ (1987), *Canadian Statistical Review*, October 1987 and earlier editions, Ottawa.

SRA. *See* State Rail Authority of New South Wales.

STA. *See* State Transport Authority - Victoria.

State of Play 4 (1986), *The Indecs Economics Special Report*, Allen & Unwin, Sydney.

State Rail Authority of New South Wales (1981), *Annual Report 1981*, State Rail Authority, Sydney.

__ (1985), *Annual Report 1984-85*, State Rail Authority, Sydney.

State Transport Authority (1985), *Annual Report 1984-85*, V/Line, Melbourne.

Transport Canada (1984), *Canadian Freight Transportation System Performance and Issues*, Ottawa.

UN. *See* United Nations.

United Nations (1988), *Annual Bulletin of Transport Statistics for Europe 1987*, New York.

US Department of Commerce (1987), *Statistical Abstract of the United States 1987*, 107th Ed, Washington DC.

US Department of Transportation (1987), *National Transportation Statistics, Annual Report, 1987*, Transportation Systems Centre, Cambridge Mass.

VIA Rail Canada Inc (1985), *Annual Report 1984*, Montreal.

__ (1986), *Annual Report 1985*, Montreal.

VIA. *See* VIA Rail Canada Inc.

Victorian Railways Board (1981), *Annual Report 1980-81*, Government Printer, Melbourne.

VRB. *See* Victorian Railways Board.

Westrail (1985), *Westrail Annual Report 1985*, and earlier years, Perth.

ABBREVIATIONS

AAR	Association of American Railroads
ABS	Australian Bureau of Statistics
Amtrak	National Railroad Passenger Corporation - US
AN	Australian National Railways Commission
ATAC	Australian Transport Advisory Council
ATCS	Advanced Train Control Systems
BR	British Rail
BRB	British Rail Board
Conrail	Consolidated Railroad Corporation - US
CN Rail	Canadian National Railways
CP Rail	Canadian Pacific Railways
CTC	Canadian Transport Commission
DB	Deutsche Bundesbahn
DoTC	Department of Transport and Communications - Australia
EEC	European Economic Community
FRG	Federal Republic of Germany
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
HST	High Speed Train
ICC	Interstate Commerce Commission - US
ICE	InterCity Express - DB
JNR	Japan National Railways
JR	Japan Railways Group
NTA	National Transportation Agency - Canada
NZ	New Zealand
NZR	New Zealand Railways Corporation
OECD	Organsiation for Economic Co-operation and Development
PSO	Public Service Obligation
QR	Queensland Railways
RIC	Railway Industry Council
SNCF	Societe Nationale des Chemins de Fer Francais
SRA	State Rail Authority of New South Wales
STA	State Transport Authority - Victoria
TGV	Trains a Grande Vitesse

TIAC	Transport Industries Advisory Council
UK	United Kingdom
US	United States of America
VFT	Very Fast Train
VIA	VIA Rail Canada Inc.
V/Line	State Transport Authority - Victoria (freight and non-urban passenger operations)
Westrail	Western Australian Government Railways Commission