

# TRANSPORT NOTES

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### *Railways in Development: Global Round-Up 1996-2005*

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*This Transport Note has been prepared as an adjunct to the 2006-07 updating of the World Bank's Railways Databases ([www.worldbank.org/railways](http://www.worldbank.org/railways)). It uses the databases for inferences on aggregate trends (and so subject to the caveats provided in the Explanatory Note cited) as well as other Bank documents and sources of policy information. It provides a high level view of traffic and policy developments. Particular emphasis is given to the Bank's six regions of operations at a time when the Bank's Transport Strategy is being updated with the intention of increasing the attention given to the role of railways in development. For completeness, important policy developments in the higher income countries are also summarized. The Note has been prepared by Paul Amos, Transport Adviser to the World Bank and Lou Thompson, Railway Consultant, and formerly Railways Adviser to the World Bank. While the content has drawn upon the broad experience and expertise of the Bank in the railway sector, any views expressed herein are strictly those of the authors.*

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#### 1. RAILWAYS IN DEVELOPMENT

In global terms, the public railway network<sup>1</sup> consists of just under a million route-km and is equivalent in length to about 6 percent of the world's paved road network. The technology and economics of railways gives them a potential advantage, if efficiently operated, in specific transport market segments.

In many developing countries, rail freight services are critical to the production, trade and distribution of bulk and other semi-bulk materials such as coal, ores and minerals, oil products, grains, chemicals, iron and steel, cement, timber and sand and gravel. Over sufficiently long distances, and with dense flows able to support large trains, railways can also provide efficient and effective transport alternatives for general freight, particularly in the movement of international shipping containers to and from ports. In the ten year period 1996-2005, the total amount of freight hauled by railways in the Bank's regions of operations (measured in tonne-kms) increased by nearly 50 percent, although with great disparity between regions, as will be seen.

In global terms about 39 percent of all rail freight in 2005 was carried by private train operators and about 61 percent by publicly-owned operators. Private ownership of freight rail operations is heavily concentrated in North and Latin America. However, there are now several small private railway freight concessions or companies in both Africa and Australasia, and some emerging niche players in Europe utilizing track access rights on publicly owned networks. However, at present in the Bank's regions of operations

as a whole, over 94 percent of rail freight is carried by publicly-owned operators.

In the passenger sector, railways can also perform a valuable economic and social role in dense inter-city corridors, for suburban transport in major cities, and in some regions where population density permits. In many cases these roles could only be transferred to road transport at a higher cost in road infrastructure, traffic congestion, vehicle emissions and traffic accidents. In the ten year period 1996-2005, the total volume of passenger traffic carried by railways in the Bank's regions of operations (measured in passenger-kms) increased by around a third. Again, there are disparities between regions that are indicated below. In aggregate terms, around 87 percent of the world's railway passengers are carried by public sector operators. In the Bank's regions of operations over 99 percent of passengers are carried by public sector operators.

About 56 percent of the world's railway network (route-kms) is in the Bank's regions of operations. However, about 65 percent of the world's railway activity takes place in these regions, taking freight and passenger traffic together.<sup>2</sup> This proportion is likely to increase, despite the fact that rail network length per capita is over five times as high in developed countries as in the Bank's regions of operations.

Despite overall strong growth trends, some national railways are in countries that do not have strong traffic flows of a kind that are most suitable for railways. They are inevitably struggling to maintain existing markets and to finance system renewal and modernization. Railways are not suitable for all transport needs. The main challenge for some countries is to concentrate public resources on improving rail infrastructure and services in the densest corridors, rather than to continue supporting the whole network including lines where road transport could provide good or better service at lower cost, or where ownership could be decentralized to local

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<sup>1</sup> Excluding metro and stand-alone urban rail systems, and excluding virtually all dedicated industrial railways operated by specific companies for their own transport. There have long been fully private mining railways, such as the CVRD railways in Brazil (EFVM and Carajas) or iron ore railways in Australia, but these were not fully common carriers holding themselves out for service to the public. There are also many other specialist railways such as sugar cane railways, forestry railways, military railways and private networks internal to industrial agglomerations.

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<sup>2</sup> Treating one passenger-km as equal to one freight tonne-km, a matter discussed in more detail in the Explanatory Notes to the Databases.

or regional governments or given over to low-cost private rail operators.

In terms of infrastructure, over 97 percent of global rail traffic, and nearly all traffic in the Bank's regions of operations, is carried on infrastructure operated by vertically integrated railway companies (including a small proportion carried using track access rights). Less than 3 percent (almost exclusively confined to some - but not all - countries in the European Union and in parts of Australasia) occurs on networks that have been unbundled into independent corporate entities, separate from train operating companies.

In contrast to the global aggregates, the Note now considers each of the Bank's regions of operation in turn. A full list of the developing or transition countries included in each region can be found on the Bank's website at: <http://go.worldbank.org/V971CO0J80>. A summary of regional traffic is given in Figure 1.

## 2. SUB-SAHARAN AFRICA REGION (AFR)

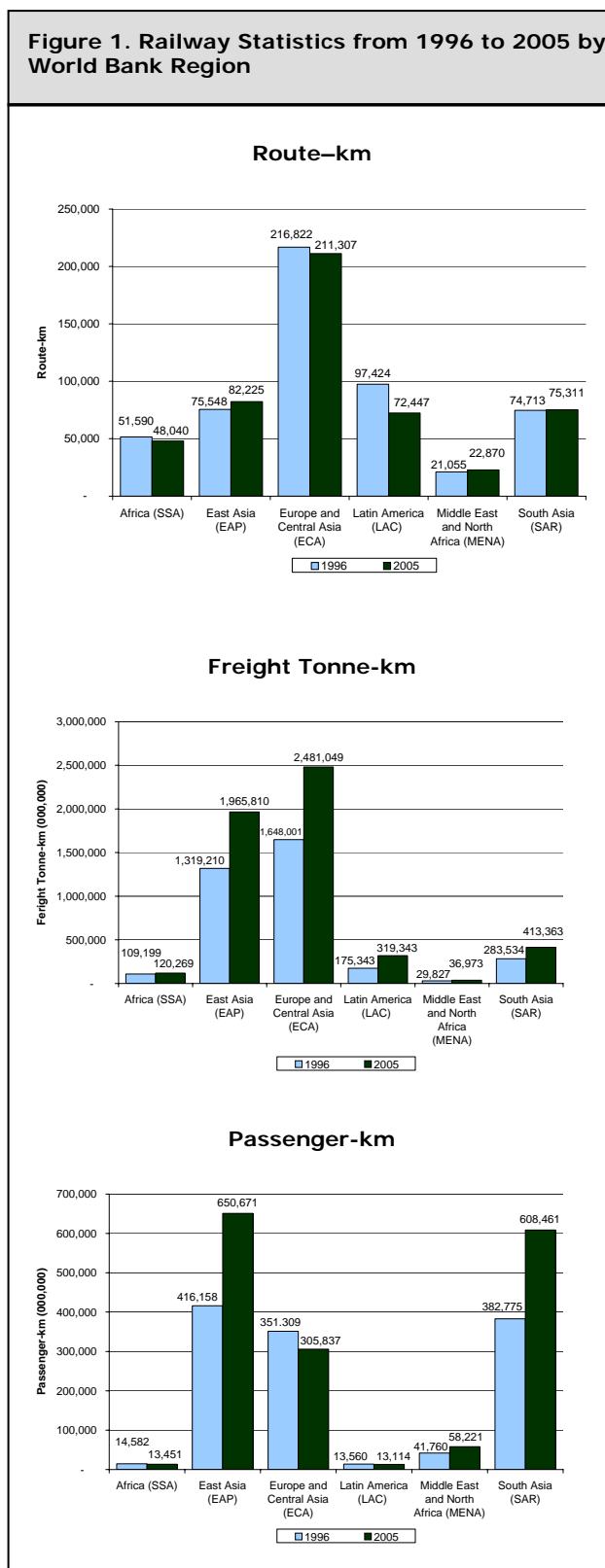
Over the 1996-2005 decade, there has been rather limited growth in rail freight traffic in the region as a whole (about 10 percent), though the aggregate result is wholly dominated by South African Railways (Spoornet) which carries over 90 percent of all the rail freight in the region. Some of the smaller private concessions in smaller African countries achieved much higher growth, though from a very low base.

So far as passenger numbers are concerned, the data are generally very unreliable in this region. In the case of South Africa, the transfer of responsibility for suburban rail services to the South African Rail Commuter Corporation (SARCC), which carries more passenger-km than all other railways in this region put together, complicates the time-series. Excluding South Africa, there appears to have been a reduction of nearly 50 percent of passenger traffic from what was already a very low base in 1996.

South Africa is discussed further below. For many of the other networks of the region, the changed role of rail over the last thirty years has seen it move from a situation where many of the systems were carrying a high share of their country's traffic to one in which their market share has declined, their assets have steadily deteriorated, their quality of service has reduced, and they are in many instances only a minor contributor to solving the transport problems of the continent. Private concessioning that has occurred in the last decade was seen, if not as a certain remedy for these problems, then at least as the best chance to avoid continued dissolution and ultimate closure. More details of the results of concessioning are given in a Bank sponsored independent review (Bullock 2005) but a summary is given below.

Since 1995, there have been thirteen rail concessions in Africa, with another seven in progress. Two of these have been cancelled, one has been badly affected by war and one has suffered from natural disasters and procedural delays. Four have operated for five years or more, but only one of these without a significant

**Figure 1. Railway Statistics from 1996 to 2005 by World Bank Region**



dislocation of some sort. Yet despite the vicissitudes, some results are positive. Freight traffic has generally increased, though passenger traffic has declined (Annex A, Table A1)

All of the African concessions have effectively been integrated concessions. They are freight dominated, but many involve or require operation of at least some passenger service by the freight concessionaire, usually at the expense of the concessionaire. The bidding process has not been strongly successful, with many concessions involving only a single bidder, and some being negotiated with a single concessionaire.

Most of the railways that have been presented for concessioning in Africa were badly run-down, requiring substantial rehabilitation of both infrastructure and rolling stock. They generally carry volumes at densities that are very low by world standards—what would be modest branch line flows in many countries. A few railways have substantial mineral traffic, but most are carrying semi-bulk freight between the interior and the ports and vice versa; only in a few cases are there significant domestic flows.

The review commissioned by the Bank found that:

- Labor productivity has increased steadily in all the concessions which have operated for over five years, and similar figures are likely to come from most of the other recent concessions. Asset productivity has also generally increased.
- The improved railway productivity, the active searching for new traffic by concessionaires and the improvement in internal business practices have all improved railway cost structure and, perhaps more importantly, lifted the level of service, thus helping to attract traffic to the mode which can carry it most efficiently.
- In general, concessionaires have lived up to the passenger service requirements in their concession agreements, even where it has been operationally difficult for them to do so, or where promised Public Service Obligation (PSO) payments have not been forthcoming in practice. However, many of these services are a hangover from previous times and the passengers served would often be far better and almost always more economically, served with a basic road-based system. Concessionaires faced with significant losses on such services are likely to be far more active in pushing for the alternatives to be considered than in a government-run rail system.
- Most African concessions have been associated with substantial investments, principally in infrastructure, by bilateral and multilateral lending agencies. Adoption of concessioning policies has been, in most cases, a pre-condition of sector lending. However, it is unclear whether, having been gifted or loaned (at concessional rates) such investment, many of these rail systems will be able to finance major future infrastructure renewals, either through concessionaire injections or from their internally generated returns. The evidence to date is that few, if any, of the concessions are generating significant profits for their operators and certainly not enough to fund long-term renewals. Although most concessions pay substantial concession fees into general government revenue,

the likelihood is that none of them could really afford to if they were properly accruing funds for future renewals. It therefore remains an open question as to whether a wholly privately financed rail concession model is achievable in many countries in this region in the foreseeable future.

- Few of the concessions are now immune from road competition, except for only some cases where roads have still to be constructed or where there are heavy mineral movements. The review yielded almost no examples of where concessioning has led to any services being reduced so that resources could be redeployed to favored users.
- Similarly, there was no evidence that personal travel has been made more expensive for the poor, nor that freight rates have increased significantly.

Overall, concessioning in Africa has started to revitalize many systems but it is doubtful whether it can ensure their long-term survival without further injections of public investments. This seems to be because of the low density of traffic on most lines that renders them unsustainable, but possibly socially and economically worthwhile.

As noted, South African railways (Spoornet) is the predominant railway in the region. Unusually, it is the only major public railway in the world that is operated as a subsidiary of a government-owned monopoly transport conglomerate (Transnet) that controls all the country's railways, ports and pipelines.

Because of perceived problems in railway performance and finance over the decade, the South African government considered various options for railway privatization but ultimately rejected this course. In the last few years, it has sought through Transnet to seek performance improvement from Spoornet within the traditional structure, involving concentration on core businesses, improvement in customer service closely tailored to business lines, improved resource utilization and investment in capacity backlogs. As noted, South African commuter rail operations have been divested and it is possible that other passenger services and low density branch-lines may be devolved to other institutions. In addition, a long haul passenger entity – Shosoloz Meyl – has been created to take over the intercity passenger services. Though the policy framework is emerging, many of the key planned business initiatives have yet to be actually delivered. While it is difficult to judge from the limited public accounts provided by its parent Transnet, it is difficult yet to discern any substantial improvement in the overall business performance of the railway.

### 3. EAST ASIA AND PACIFIC REGION (EAP)

Aggregate statistics for the region are dominated by China which carries over 98 percent of the region's railway traffic. Freight traffic, in both China and the region, grew strongly (about 50 percent over the period). Rail freight in Vietnam and Mongolia grew even more strongly, albeit from a very low base, but there was only modest growth of about 20 percent in Thailand and falls in freight traffic in Indonesia and Malaysia.

Passenger traffic in China grew by about two thirds and in the region as a whole by about 60 percent, with declining passenger traffic in Malaysia and Thailand.

The Chinese railway system (China Rail) is organized under the Ministry of Railways of China (MOR). It has 18 regional operating railways operating about 62,200 route-kms in 2005, an increase of just over 6000 km in the decade.

Taking a somewhat longer view, in 1980 China Rail was the fourth largest railway in the world in terms of passenger traffic. By 2005 it had become the largest passenger carrier, generating about 26 percent of the world's passenger traffic. Similarly, in 1980, China Rail was the third largest rail freight carrier globally, accounting for 8.5 percent of the world's rail freight traffic. By 2005, MOR was the second largest freight carrier (after the US Class I system) and carried nearly 23 percent of the world's freight traffic. Taking freight and passenger traffic together, China Rail is now the largest railway in the world.

Despite being the only major railway in the world to increase its network significantly, China Rail's traffic density (40.5 million traffic units (TU)/km of line) is the highest in the world, nearly twice the next highest (Russia at 23.8) and far higher than the US (16.1) and India (15.5). Freight wagon productivity (tonne-km/wagon) is also the highest in the world.

In 2004 China's State Council approved MOR's *Mid and Long-Term Railway Network Plan* (Ministry of Railways 2004) which sets out the investments required through 2020 to keep pace with the demand. The plan will increase route-km to 100,000 km by 2020, increase electric traction from 31 percent of the existing system to 50 percent of the system, and will increase double track lines from 39 percent to 50 percent. In addition, 7,000 km of the new system will be dedicated passenger-only lines operating in ranges of 200-300km/h speeds, thus improving services while freeing up existing lines for freight growth.

The total program is expected to cost over \$200 billion.<sup>3</sup> Analysis has indicated that this amount cannot be financed from internal earnings. The Chinese Government has not committed to central government financing, though provincial government and some private resources are being accessed through joint ventures.

The large investment needed will require structural changes in the rail industry to ensure the most efficient use of resources and the mobilization of external funding to complement public sources. In response to strategic goals set by the national leadership, the National Development and Reform Commission (NDRC) has decided the framework for such reform of the rail industry, among others, and set out the underlying policy principles in *State Development and Reform Commission: China's Key Reforms in Seven Fields in*

2004.<sup>4</sup> This document has identified three such principles to underpin the reform process in China:

- separation of government administration of the railways from enterprise management;
- introduction of competition where suitable; and
- effective industry regulation.

MOR has already taken several major steps to facilitate subsequent structural and organizational reforms, including separation of non-core units, accounting separation of passenger transport business, concessioning of some 100 branch lines to joint ventures of regional railway administrations, provincial governments and other enterprises, establishment of regulations to permit foreign investment, and establishment of special-purpose subsidiaries. It has also eliminated an entire administrative level, the sub-region, reducing administrative costs, allowing for more efficient programming and through-running of locomotives and crews throughout the network and streamlined asset utilization generally. However, the fundamental separation between government administration (policy and regulation) on the one hand, and commercial railway operations on the other has not yet occurred.

There was little structural change in the decade to 2005 in the other main railways in the region. There has been no significant increase in private participation in non-urban railways. However, studies carried out in Cambodia during the period, suggested that private operation might be necessary to try to revive the nearly destitute Cambodian Railways. The Government of Cambodia is currently trying to concession the railway by international tender, supported by a potential loan from the Asian Development Bank for system rehabilitation, assistance from the Thai Government in reconnecting at the border, and a donation of second hand rails from Malaysia to help complete the link.

#### 4. EUROPE AND CENTRAL ASIA REGION (ECA)

This World Bank region consists of 27 countries, stretching from the borders of Western Europe to the Pacific Ocean. These countries range from the largest by area in the world, Russia, to some of the smallest, such as Moldova and Armenia. The railway systems in these countries also vary greatly due to: their geo-political history (for example, whether they were part of a wider system such as the former Soviet or Yugoslav railway systems); country location (some are landlocked); main economic activities (particularly whether or not there are high production levels of bulk natural resources such as coal, ores or oil); international trading patterns; and population density and distribution.

Despite their diversity, the common factor among railways in the region is that they are operating in transition economies. These economies are evolving from ones in which central economic planning largely determined the role, scale and resources devoted to the

<sup>3</sup> All dollar amounts are U.S. dollars unless otherwise indicated.

<sup>4</sup> Xinhua Net Beijing, April 14, 2004; report on "Opinion on Implementing the Guidelines of the Decision of the Third Plenary Session of the 16<sup>th</sup> Party Central Committee in Pushing the 2004 Economic Reform."

railway system. Even in Turkey, which is not formally a transition country, the role of the state in the railway industry has been pervasive.

This region has the largest rail network among the Bank's regions of operation reflecting the strong role that was assigned to railways in passenger and freight sectors when they were planned economies. In the decade 1996 to 2005, the rail network in the region declined very marginally (by less than 2 percent).

Freight traffic in the region increased in the decade by around 51 percent from the levels of 1996 (after a period in which traffic levels had been in free-fall for a number of the early years of transition). The increases are not uniform across the region. The strongest increase has been in Russia and Kazakhstan as a result of the resources boom; in the Baltic countries which act as conduits for Russian and Kazakh resource flows; and in Azerbaijan and Georgia as a result of flows of transit oil and oil products from the Caspian and Kazakh oil fields. Freight flows in Croatia, Serbia and Bosnia & Herzegovina are currently recovering from the very low levels of the years of conflict. But many other countries have seen substantial (and probably permanent) reductions in freight since 1996 reflecting underlying economic restructuring, including in countries such as Bulgaria, the Czech Republic, Slovakia, Poland and Romania.

In passenger markets traffic declined over the decade by nearly 13 percent, with a decline in Russia of about 5 percent, but larger reductions just about everywhere else (between 20-40 percent). To discern precise trends in freight and passenger traffic for any particular country it is important to look to the detailed time-series for that country; for some, the low point of transition was later than 1996, so it is possible that an overall change in the period is not reflective of more recent trends.

As noted, market forces, rather than central planning, now largely determine the generation, distribution and market shares of transport demand in the region. One significant indicator of the transition throughout has been in labor restructuring. During a decade in which traffic increased by around 40 percent, more than 850,000 people left the railway industry in this region. This constitutes over a quarter of 3.1 million people working in the industry in 1995. Significant staffing reductions occurred in nearly all countries other than Belarus.

Those railways enjoying a combination of the highest traffic densities and the lowest proportions of passenger services have, as would be expected, been most financially robust through transition. They have had relatively low or no government subsidies: they include Russia, Kazakhstan, Estonia, Latvia, Lithuania, Uzbekistan, Georgia and Azerbaijan. By contrast, those with a relatively low traffic density and a high proportion of passenger traffic have suffered much more serious financial difficulties: they include the larger Central European railway systems such as Poland, Romania, Czech Republic and Bulgaria. Not unexpectedly, the most financially distressed railways of all are those that have few bulk flows to serve and which combine low traffic densities with a high proportion of passenger

traffic: Turkey, Croatia, Macedonia and Albania are in this category.

There are many impressive stories of policy development in railway industries in the region, some of which are described in more detail elsewhere (Amos 2005). Because of its size, it is instructive to focus on the Russian railways in more detail. In the decade since 1996, Russian rail freight grew by about 64 percent and total traffic by about 55 percent. Over the same period it reduced staff by about 27 percent thereby doubling its overall labor productivity. In 2001, the Russian Government instructed the then Railway Ministry (MPS) to develop a reform plan in conjunction with the other tutelary Ministries (Transport, Economic Development). The plan was submitted and approved in 2002 (with in-flight adjustments since) and is being implemented. More details of Russian railway reform can be found in Pittman, Thompson and Perkins 2004, and Thompson 2006.

In broad terms, the plan called for the establishment of an open Joint Stock Company (OAO RZD) to take over the enterprise functions of the railway, whereas the formerly ministerial functions (planning, safety, tariff regulation) were transferred to government (MOT and the new regulators). OAO RZD is now a holding company, with internal subsidiaries that own and manage infrastructure, freight and passenger services.

In principle, the Russian infrastructure is open for competing entry, though the legal regime needed for competing entry is not fully developed. The freight tariff structure does permit reductions for private wagons and locomotives, as well as negotiated reductions for independent provision of on-board crew.

Russian railway policy makes a distinction between "operators" and "carriers" that does not exist in Western practice. An "operator" is an independent entity that furnishes its own wagons (and, in principle, its own locomotives) and uses the OAO RZD freight carrier to haul its trains. Freight tariffs permit a (roughly) 15 percent reduction for wagons and another 20 percent reduction for locomotives. A "carrier" would furnish rolling stock and crews and would accept the common carrier obligation to ensure the cargo and provide system-wide service. Especially because of the system-wide service requirement, there are no significant competing carriers yet, and opinions in Russia differ as to whether there will (or should) be.

OAO RZD has supported the idea of operator "competition," which, in practice, means that independent entities compete with RZD to supply rolling stock. This innovation (whether or not it is really "competition"), has been quite successful in attracting private investment in rolling stock. Between 2003 and 2006, the percent of tonnage hauled in privately owned freight wagons rose from 27 to 35 percent. An analysis of the cost of wagon ownership suggested that the 15 percent tariff reduction for wagon ownership should encourage private investment, and the OAO RZD goal of eventually having half the freight wagons owned privately seems feasible.<sup>5</sup> Although private locomotives

<sup>5</sup> The Russian freight tariff structure is commodity dependent, with three major commodity classes according roughly to the

have been slow to emerge because of the technical complexity of licensing new locomotives, there are reasons to believe that the incentive for private ownership of locomotives may actually be stronger than for wagons and that private locomotives will eventually emerge.

OAO RZD has already established a wholly owned subsidiary to manage intercity passenger service and has obtained Government commitment to provide PSO support for those intercity passenger fares and services imposed by the government(s). This support should be phased in by the end of 2009. Suburban passenger services are gradually being established as separate closed Joint Stock Companies in partnership with local or regional governments. The policy calls for eventual assumption by local authorities of a major share of the PSO support for these services, but progress has been slow.

There are some private rail freight train companies using access rights to offer services in some countries such as Romania and Poland (discussed below). However, the only major rail privatization that occurred in this region in the decade was in Estonia.

In 1997 the State-owned enterprise Eesti Raudtee was split into a number of new entities. The main company became a joint-stock company Eesti Raudtee AS operating under companies legislation, and responsible for the main international lines and freight services using them. Predominantly domestic passenger lines in the south and east of the country were vested in a new passenger company, Edelaraudtee Ltd, which was then privatized. Edelaraudtee also now offers some passenger services on Eesti Raudtee's network under a service contract with the government for which it pays track access fees to Eesti Raudtee. International passenger services (to/from St Petersburg and Moscow) were transferred to a train operating company, EVR Express; 51 percent of shares were sold to investors and 49 percent were retained by EVR. Commuter trains in the Tallinn area were also transferred to a suburban train operating company, Electriraudtee Ltd., still publicly owned.

In April 2000, the Estonian Privatization Agency announced the impending sale of 66 percent of the share capital of Eesti Raudtee AS to a strategic investor through an international competition. Following a rather vexed competition in which an initial preferred bidder was unable to complete the transaction, majority ownership was sold to the second preferred bidder, Baltic Rail Services (BRS), in August 2001. This was the first privatization of a vertically integrated national railway in Europe. Because Estonia would be joining the EU, EVR was required to grant access to the infrastructure in return for an access fee that would be regulated by the government.

Over the decade, EVR was transformed from a residual operating division of the Soviet railway system to one of

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freight costs as a percent of delivered commodity value. Since the 15 percent reduction applies to the commodity tariff, the incentive is in effect higher for the higher rated commodities. In fact, private wagon ownership was nearly 40 percent by 2006 (versus 29 percent for low rated commodities) suggesting that the incentive is having the predictable impact.

the most successful and profitable freight railways in Europe. The simplicity of the network, the key role of the Port of Tallinn, high levels of transit traffic to/from Russia and Kazakhstan, and Russian/Kazakh resources boom were certainly all very favorable to success. Nevertheless the government of the time must take credit for the clear-sighted way in which it first commercialized the organization, separated out the loss-making passenger services and branches, and put its faith in private ownership and operation of the core freight operation.

Although the financial performance of EVR was already improving before privatization, the impact of private ownership and management appears to have been considerable. The company completely replaced the old Soviet era locomotive fleet with reconditioned US locomotives. Virtually all indicators of capacity, staff and equipment utilization and safety improved significantly. In 2003, the company had an operating ratio of around 65 percent, easily the best of any national railway organization in Europe.

Beginning in 2003, however, Russian-based companies began using the EVR infrastructure to move oil products through the Port of Tallinn. This ignited a dispute over the access charge to be paid, with the new operators arguing for marginal cost charges and EVR arguing for higher charges. The Estonian regulator took a position much closer to the new operators' position, and litigation ensued. The access charge dispute became irresolvable, and the Estonian Government renationalized the railway in late 2006.

## 5. LATIN AMERICA REGION (LAC)

Latin America is one of the more difficult regions for which to obtain complete data for the decade because most of the railways there were under private concession for much of the time and less commercial information is made available than is usual in public railways. The Bank's Railway Databases contain whatever data are publicly available on the performance of the concessioned and privatized railways in Latin America. But private owners are reticent about releasing any information not required by shareholders or regulatory authorities, and reporting requirements and accounting standards are often lax. Regulatory authorities have also not always been thorough in specifying and publishing the data needed for regulation (Argentina and Brazil are favorable exceptions, Mexico and Peru are not). As a result, a complete time series is available only for the Argentine and Brazilian railways, and for the two largest concessions in Mexico.

However, in overall terms it appears that freight traffic in the region increased by around 80 percent over the decade, heavily concentrated in Brazil, Argentina and Mexico while passenger traffic decreased marginally.

Concessioning of the Argentine railways was virtually complete by 1996. The Brazilian railways were concessioned between 1996-1998; Mexican railways between 1996-2000; Bolivian railways in 1996; Chilean railways 1995-1997, Peruvian railways in 1999, and Colombian railways in 1999. By the second half of the

decade the Latin American railway industry was overwhelmingly privately operated.

The Argentine program involved establishing a series of six integral concessions for freight and six suburban passenger services (the Metro in Buenos Aires was also included in the concessioning program).<sup>6</sup> These concessions were put out for competition. The freight concessions were 30 year integral concessions in which the bidders competed on maximum payment to the government,<sup>7</sup> whereas the passenger concessions were awarded on the basis of minimum payment by the government for a specified network to be operated. In both cases, the competition was based on the sale of essentially exclusive access to the market: that is, these were competitions **for** the market rather than promoting competition **in** the markets. All but one of the freight concessions advertised were successfully awarded (one was eventually transferred to the labor union) and all of the passenger concessions were successfully awarded.

Brazil followed a similar pattern, breaking the old national railway (RFFSA) into six freight concessions, all of which were successfully awarded. Two years later, the freight railway in Sao Paulo (FEPASA) was also concessioned, as were the Metro and the suburban passenger services in Rio de Janeiro. Brazil followed a modified labor procedure in which part of the labor force was reduced with compensation financed by a World Bank loan before concessioning, and the remainder of the labor force modification was left to the concessionaire, but using the pre-negotiated terms.

Mexico followed a similar path, breaking its old national railway (FNM) into three large parts and a number of smaller branch line operations, all of which were successfully awarded, though one had to be withdrawn and re-competed before being awarded. Mexico developed a third approach to labor in which all employees were paid an amount to reflect their security status as federal employees, and then all were discharged and encouraged to negotiate new employment with the concessionaires.

Chile developed a unique approach. The main part of the Chilean system – the broad gauge network from Santiago to the Pacific coast and to the south was split between an infrastructure company (EFE) that also operates the intercity and suburban passenger services, and a freight company (FEPASA) that had non-exclusive trackage rights over the EFE infrastructure. In more recent years, other operators have been allowed on the network.

Freight concessioning, usually in integral form, also took place in Bolivia, Peru and Guatemala, and has been considered in partial form in Uruguay; suburban and Metro passenger concessioning has progressed in Brazil and in Mexico. It is worthwhile noting that, with the

exception of the two northern Mexican concessions that connect to the US system, all of these concessions were formed by Latin American bidders (sometimes with an expert operating partner from the US, Canada, Spain or South Africa). It is also interesting that some have cross-border ownership.

In addition to concessioning, there were two significant privatizations in Latin America. In one case, the northern, meter gauge part of the Chilean network was completely sold and privatized. To complete the picture, a new and private Brazilian railway, Ferronorte, was completed in 2001, primarily to support soy export traffic from Brazil (though it has also recently purchased parts of one of the original RFFSA concessions).

Table A1 (Annex A) shows the results of the major Latin American freight concessions from concessioning to 2005. In summary terms, freight traffic after concessioning grew at an average annual rate of 5.7 percent in Argentina, 7.5 percent in Brazil and 7 percent in Mexico. The Argentine network is now only about two-thirds as large as in the last year before concessioning, with about 18 percent of the labor force, but carries 84 percent more traffic. The Brazilian network is about the same size as before, has half the labor force and carries 54 percent more traffic. In Mexico, the two largest concessions on which data are available still have 90 percent of their former network, employ 40 percent of the people, and carry 60 percent more traffic.

Table A2 (Annex A) shows similar data on the major Latin American passenger concessions, which are confined to suburban and Metro services. Results in the passenger area are not so positive: traffic grew only slowly on some Argentine concessions while actually shrinking on others (it is argued that this is a result of the economic problems of 2002 and 2003 that are only now being recovered). While traffic appears to have grown rapidly on Supervia and Opportrans (the Rio Metro) in Brazil, this is misleading because the Metro services opened a new line immediately after concessioning and Supervia, though it has grown after concessioning, is still only about half the level it had reached in 1987. In both countries, it is fair to say that the passenger systems are operating about the same networks and carrying somewhat more traffic than before concessioning, with about 30 percent of the prior labor force.

A recent independent review on Latin American rail concessioning concluded that railway concessioning in Latin America has been subject to some controversy, with majority opinion viewing the process as a moderate to sizable economic success, but with dissent on some issues (Sharp 2005). The review noted that concessioning has been successful overall *in preserving and reviving railway operations on existing assets*. The process also clearly addressed immediate fiscal problems faced by most of the countries that concessioned their railways – the burden of large state rail deficits was quickly relieved (although in counties retaining passenger service, subsidy relief was not as great as hoped). Concessioning did not contribute as much as was hoped by some parties (whether or not these expectations were realistic) to solving the region-wide problem of underinvestment in transport assets,

<sup>6</sup> The government decided that the intercity passenger trains did not merit support from the federal government, but did allow provinces to continue intercity passenger services if they wished to do so. Most intercity passenger services were discontinued, but a few remained. Recently, the government has examined the possibility of reinvesting in intercity passenger services, with an outcome that is not yet clear.

<sup>7</sup> See Thompson 2001 for more detailed discussion.

nor has it eliminated the need for public investment in railway capacity.

Issues that have given rise to criticism in specific areas include the failure of concessions to meet investment promises/commitments, the severity of labor cutbacks, the continuing need for subsidies (particularly for passenger services), reductions in, or elimination of some services (particularly intercity passenger services), rate increases (particularly post-2000), possible discrimination among shippers and lack of competition. At least some of these criticisms appear misplaced. The main objective of private participation in railways, as in other areas of the economy, is to attain a commercial approach to transport business operations. Commercial operators cannot be criticized for acting commercially. If specific commercial actions are not prohibited by concession agreements (or by law), or if obligations are not enforced by regulatory process, then it is reasonable to infer shortcomings either in expectations or regulations rather than in concessioning per se. There are no indications that any of the concessions are earning undue profits.

## **6. MIDDLE EAST AND NORTH AFRICA REGION (MENA)**

In the region as a whole, freight traffic increased by about 24 percent over the 1996-2005 decade and passenger traffic by about 40 percent.

The railways of the region vary considerably in their characteristics. Egyptian National Railways, for example, is a passenger dominant railway (91 percent of the traffic is passengers), whereas Jordan (the Aqaba Railway) has no passenger traffic at all. The two largest railways (Egypt and Iran) account for 62 percent of the freight traffic and 89 percent of passenger traffic in the MENA region.

Over the ten year period (1996-2005), Algeria, Egypt and Tunisia lost freight traffic, whereas freight traffic on the other railways grew by 30 percent or more. The largest railway, Iran, gained 40 percent more freight.

By contrast, only Algeria lost passenger traffic (almost 50 percent), whereas all other MENA countries gained, from 30 percent to over 100 percent.

There have been productivity improvements across the region because, despite growing traffic, the labor force decreased everywhere (but Syria), with overall reduction in the region of about 15 percent. However, there was little private sector participation in railways in the region. The Aqaba railway was advertised for a concession, and a concession was actually awarded; subsequently, the Jordanian Government changed and the concession was withdrawn.

More recently, the Government of Saudi Arabia has announced plans to concession the existing Saudi Railway and promote three BOT concession extensions Riyadh to Jeddah (950 km), which would complete the Landbridge across the Arabian Peninsula, and would also include passenger services to Mecca and Medina; Dammam to Jubail (115 km), thus extending rail service up the coast; and, a future extension from Riyadh up to

Al Jalamid (1300 km) to serve large deposits of Bauxite and Phosphate.

## **7. SOUTH ASIA REGION (SAR)**

Over the 1996-2005 decade, the region's rail freight grew by about 45 percent and its passenger traffic by 59 percent. There was about a 10 percent reduction in staff.

Indian railways (IR) accounts for nearly 98 percent of all of the rail freight traffic in the region, and about 95 percent of the rail passenger traffic. With almost 59 percent of its total traffic as passenger traffic, IR is actually the least passenger dominant railway in the region. The other railways have passenger traffic ranging from 82 percent (Pakistan), 83 percent (Bangladesh) and 97 percent (Sri Lanka). Moreover, the growth rate of freight traffic in India (47 percent) was more than matched by passenger growth (61 percent), so IR actually became more passenger dominant over the period.

One of the reasons for the passenger dominance on these railways is clear: they charge among the lowest passenger fares in the world, and among the higher freight tariffs. For example, the ratio of the average passenger fare to the average freight tariff in the South Asia region ranged from 0.14 to 0.37 in 2004 (the latest year for which comparable data are available). As discussed in the Explanatory Note to the Railways Databases, analyses have indicated that it usually takes more labor and other inputs to produce a passenger-km than a tonne-km; on the other hand, passenger loadings are extremely high on many services in South Asia which partly reduces the average resource cost/passenger and increases the revenue/carriage.

There was been little institutional change in this region in the decade. However, the financial performance of IR has improved dramatically since 2004 by technical and pricing measures to increase the average wagon loadings and turn-around times for freight and to improve average revenue yields in higher passenger classes.

The Government of India (and IR) has more recently been considering the construction of a new and entirely separate freight rail lines in the "Golden Quadrilateral" that connects Mumbai, Delhi, Kolkata and Chennai. It is not finally decided whether these lines will be constructed and controlled by IR, by an independent agency, or through some form of public private partnership. The new freight lines are made necessary partly due to growth in cross-subsidized passenger services, but more positively would enable infrastructure to be purpose-designed for high productivity freight operations, including heavier axle weights, longer trains and double stacking of containers. Indeed, the freight operations on the new lines would need to seek every means to be more productive in order to repay the capital costs of the new dedicated lines, and their ability to continue to cross-subsidize passenger services would be curtailed or eliminated. If the freight operations were to be separated and their finances ring-fenced to service the new infrastructure debt (as would seem both



necessary and desirable), it would create a considerable challenge to the sustainability of the existing passenger operations at existing fares. The examination of the proposed dedicated freight infrastructure could therefore lead to a more far-reaching review of railway policies and structures overall.

Rail freight was stable over the period in Pakistan but increased by 30 percent in Bangladesh. Passenger traffic increased by 28 percent in Pakistan and 30 percent in Bangladesh. As noted, neither railway undertook major structural change in the period, though both reduced staff levels between 10-20 percent and Bangladesh beneficially outsourced sales and fare collection on many trains. More recently governments in both countries have endorsed policies to commercialize railways, separate passenger and freight services into different lines of business, and invest in infrastructure improvements, particularly on the main rail corridors serving ports. There is still a long way to go in implementation.

## 8. HIGH INCOME COUNTRIES

### 8.1 North America

The integrated freight railways of North America—the Canadian Pacific (CP), the Canadian National (CN) and the Class I railroads of the US—have seen significant developments since 1996. Freight traffic has grown steadily, by over 25 percent in the US and over 60 percent in Canada. They account for slightly over one-third of the world's railway freight traffic. By nearly every measure (except traffic density, TU/km), they exhibit the highest productivity performance in the world.

During the decade, there has been a continuing strong commercial trend in North America toward mergers because of pressure to reduce costs and offer better service. There were 11 Class I (large) railroads in 1996 and 7 in 2005. Some of the 7 are now fairly small in comparison to the largest. A second major change was the privatization of the CN in 1997. By itself, the CN would be the fifth largest freight railway in the world (after Russia, China, India and the US Class I system).

There are also about 30 “regional” and over 500 “local” (short line) railways in the US and Canada. These are mostly independent railways that were formed from abandoned parts of the Class I railways (the line km of the Class I system has shrunk in every year since 1930). The regional railways average about 800 km of line, and about 250 employees, whereas the short line railways average about 90 km of line and 25 employees. Taken together, the regional railways account for about 11 percent of the total US line km and about 4 percent of the employees while the short line railways account for 21 percent of the total line km and 7 percent of the employees. The industry also contains specialist terminal and yard operators, and some specialist train operating companies that do not own infrastructure but purchase access rights from others. There is an active market in buying and selling the smaller railways, and there are several companies in the business of owning and operating small railways throughout the country. Several

of these companies were also investors in rail freight concessions in Latin America and Africa.

The great number and diversity of different but largely successful rail freight entities in North America attests to the strength of a largely deregulated private sector and the benefits of competition and market forces in the rail freight industry. It also demonstrates that adoption by countries of single-supplier solutions to railway organization to serve such a heterogeneous and dynamic market as freight logistics is unlikely to yield the optimum result.

Long-distance passenger services in North America are now very limited in number, and insignificant in comparison with freight. Suburban and regional networks are also operated in some major cities. In both cases, as in most of the world, the North American passenger services are both publicly-owned and subsidized, though this is via direct subsidies rather than (in many countries) through cross-subsidies from freight. Moreover, the long haul passenger services in the U.S. (Amtrak) and Canada (VIA) are public companies that operate almost entirely over the tracks of the private freight railway. In terms of length of line operated (around 40,000 km of rail line), Amtrak is the largest infrastructure-separated train operating company in the world.

### 8.2 EUROPEAN UNION<sup>8</sup>

The European Union, even with recent accessions, carries less than 5 percent of the world's rail freight and less than 16 percent of its passenger traffic. In the EU, public ownership and operations predominate.<sup>9</sup> However, a new model of railway industry organization is taking root, driven by European Union legislation aimed at increasing the economic role of railways and gaining social and environmental benefits. This model has involved varying degrees of separation of railway infrastructure from train operations (but not necessarily full vertical separation)<sup>10</sup> alongside the implementation of defined access rights for third party train operating companies.<sup>11</sup> From January 1, 2007, there has also been “open” access to properly licensed freight train operators anywhere on the European Union network where capacity exists.

Railways in the EU gained a number of new members in 2004 and again in 2007. There were, however, 15

<sup>8</sup> Some World Bank countries of operation acceded to the European Union during the period to 2005 and mentioned in this section where relevant. Main coverage is given in Section 4.

<sup>9</sup> Since re-nationalization of Estonian Railways (Section 4), only the British railway industry could be described as privatized and even the network itself has been effectively re-nationalized.

<sup>10</sup> Countries such as Germany, for example, have separated businesses within a holding company structure; this is a means of managing integration within EU rules rather than vertical separation. Some countries such as UK, Romania and Netherlands have adopted full institutional separation.

<sup>11</sup> Although new in modern terms, early C19 railway legislation in UK, France and the USA anticipated access to infrastructure by independent transport service providers, as had been the case with canals. In the USA today around 25 percent of the network carries tenant operators under track access agreements.

member countries included in the Database (Luxembourg is not included in the database) that joined the EU before 1996. For these 15 members, over the 10 year period, route-km declined by 5 percent, freight tonne-km grew by only 8 percent, passenger-km grew by 12 percent, and the labor force shrank by 18 percent. As of 2005, these 15 members represented slightly over 4 percent of the world's rail tonne-km and almost 19 percent of the world's passenger-km. Taken together, passenger traffic represents about 57 percent of their activity and, with passenger traffic growing faster than freight, the percentage of passenger traffic is likely to increase.

The European Commission has estimated that the 15 railways represent about 8 percent of passenger traffic, and around 15 percent of freight traffic in the European Union. The support given by the countries to their railways in 2001 (the latest year for which a study has been done) was estimated to be €38 billion (\$50 billion), of which about €600 million were estimated to be directly attributable to freight. This amount does not include the capital grants being spent under the Trans-European Network (TEN-T) program (up to €10 billion/year over the next 15 years).

There are two policy thrusts bearing on European railways. One is the emergence of the "EU Model" in which infrastructure is financially or institutionally separated from operations with state support (if any) restricted to infrastructure accessible to all and to social services such as suburban passengers or rural freight services. The second thrust is the facilitation of third party public or private train operators to provide train services on public infrastructure.

The United Kingdom furnishes the most extensive example of both infrastructure separation and private sector involvement. A full account is given elsewhere (Thompson 2004). In summary; in 1995, British Railways (BR) was broken into a number of pieces. There was an infrastructure company (Railtrack), which was privatized. There were 25 sets of operating services (Train Operating Companies, or TOCs) that were competitively awarded to the private sector as franchises. Some of them paid the government for the franchise, others initially required public support but would eventually pay (or promised to pay) money to government, and some would always require PSO support. Most of the passenger franchises were exclusive, although there was always some limited competition between end-points in some markets, and the possibility has existed that new entrants could be authorized. Freight services were privatized (not franchised, since open access to Railtrack's infrastructure removed any potential franchise value) in two major pieces, neither of which had exclusive access rights. The old BR rolling stock fleet was split up and sold to three newly created leasing companies (ROSCOs) that were to maintain the rolling stock and lease it back to the operators. The old BR track maintenance capability was sold to private companies that were awarded maintenance contracts with Railtrack. Finally, a large number of other bits and pieces (engineering and consulting companies, real estate investments, etc) were privatized.

The results in the United Kingdom are contentious. The U.K. franchises were able to increase passenger demand by about 50 percent in the 11 years of concessioning, which was 10 points more than any other EU country (over the same period, the full 25 EU members increased total passenger demand by only 4 percent!). The U.K. freight operators (primarily EWS) were able to increase freight traffic by 80 percent after privatization faster than all but two other EU freight operators (Estonia and Latvia), and far above the EU total, which actually shrank by one percent over that 11 year period). In addition, the average age of the U.K. passenger fleet has been significantly reduced through investment by the leasing companies and direct investments by TOCs and suppliers.

Unfortunately, the positive traffic developments had a downside. With train-km on the system up by around 30 percent since 1994, the result has been network congestion. With passenger-km up by 50 percent and train-km up by only 30 percent, another result has been more passenger crowding. More seriously, the original infrastructure owner and manager, Railtrack, committed a series of management errors and failed in 2001. It has been replaced by a "not for dividend" entity, Network Rail, whose funding is subject to government guarantees and which has taken on the job of managing and upgrading the network. Not all TOCs have been successful, and the government has often been forced to renegotiate the terms of franchises. In addition, partly because of the intensity of the upgrading effort on the network and traffic congestion resulting from traffic growth, costs have accelerated, both in the investment and operating areas.

Although more slowly than in the United Kingdom, private operators are slowly emerging on the separated networks of the EU, with a number of private freight operators emerging throughout Western Europe. There are several niche rail freight operators in Germany. One company, Rail4Chem specializing in chemical transport appears to be growing rapidly throughout Europe. Private freight operators are also growing in Romania and Poland, and a French passenger operator (Connex) is now operating freight trains in France and Germany (despite intense labor opposition in France). It deserves emphasis that, because the EU rail infrastructure is now open for all properly licensed freight train operators where capacity exists, concessioning or franchising in the freight area (which implies exclusivity) is not possible; privatization of existing state rail freight companies or entry of new private operators are the routes to private sector participation.

There are not yet any general rights of access to passenger train operators and a number of European countries are now beginning to award franchises for passenger operations on their networks.<sup>12</sup> So far, this has been mostly confined to the Netherlands, Germany and Sweden, but is under consideration in other countries. After the United Kingdom, Sweden has the most extensive franchising experience, with over half of

<sup>12</sup> See Thompson, 2006, for a discussion of the experience with franchising in EU railways and Australia and of concessioning in Latin America. This paper also has a bibliography of other studies on the subject as developed in an ECMT conference in early 2005.

all passengers in Sweden now carried by franchises.<sup>13</sup> Passenger franchising experience outside UK has so far been entirely limited to localized services that depend on public support, primarily because European Commission rules permit these services to be awarded competitively. The results have been generally favorable, especially in forcing down costs that the national railway had been charging. Analysts ascribe this result to competition or the threat thereof.

### 8.3 Australia and New Zealand

Australia has not been covered in the World Bank's Railways Databases. The structure of railway ownership and operation in Australia, and the process by which they have evolved in the past 30 years, are complex and detailed elsewhere (Greig, Williams and Wallis, 2005).

Overall, Australia has around 40,000 km of rail line, making it one of the world's larger freight networks. In total, in 2004/2005 the Australian railways carried 635 million tonnes of freight (see Table A3, Annex A), of which about 616 million tonnes were bulk commodities (mostly coal, ores, and grains). Only two percent of the total tonnage crossed a state line: 98 percent of the tonnage was short haul (249 km average), bulk moves for processing or export, and 43 percent was carried on private railways having no significant connections to the rest of the network.

Prior to 1995, all common carriage railways were publicly owned and operated by state governments as vertically integrated systems. Although the steps in the evolution are very complex, since 1995 freight train operators have had a general right of access to the entire public railway network in Australia under National Competition Policy.<sup>14</sup> A substantial part of the interstate railway network is now managed by the Australian Rail Track Corporation (ARTC), established in 1997, which sells train paths to a number of private train operating companies who work these routes.<sup>15</sup> Because of heavy road competition, ARTC is not expected to achieve full recovery of the economic costs of infrastructure in the short to medium term, but it does recover its recurrent costs and a proportion of its periodic renewals.

Infrastructure management, train path allocation and track charges are all set by ARTC.<sup>16</sup> ARTC does not run any trains itself (though separation of infrastructure from operations is not a legal requirement of the Competition Principles Agreement). Regulatory oversight

<sup>13</sup> The percentage of passengers is high because the Stockholm Metro was franchised. The percentage of passenger-km would be much smaller.

<sup>14</sup> Competition policy is set out in the Trade Practices Act (1974). Access to the rail network was adopted as an integral part of competition policy in the 1995 Competition Principles Agreement between the Commonwealth (federal) and State Governments.

<sup>15</sup> The ARTC network comprises standard gauge tracks linking Wondonga (Victoria), Melbourne (Victoria), Adelaide (South Australia), Broken Hill (New South Wales), Tarcoola and Kalgoorlie (Western Australia). It is also responsible for operating and maintaining the network in New South Wales outside the Sydney and Newcastle metropolitan areas.

<sup>16</sup> ARTC's Standard Track Access Agreement template is provided at its website at [www.artc.com.au](http://www.artc.com.au)

of track access on this network (and in other parts of Australia) is provided by the Australian Competition and Consumer Commission.

Most other state-based rail freight systems (which carry more traffic than the interstate network) have been privatized as vertically integrated companies. Queensland Railways however, remains in state ownership, although it operates freight services outside Queensland and recently itself successfully bid for Western Australian rail freight operations.

Vertical separation for freight also led to the creation of a national, long haul passenger operator, the Great Southern Railway (GSR). GSR is a private corporation providing overnight, tourist-based passenger services from Sydney to Perth and from Melbourne and Adelaide to Darwin. GSR operates on a "hook and haul" basis in which GRS provides the coaches and all passenger services and an operating freight carrier provides locomotives and drivers. Most of the suburban and local passenger services are operated on a vertically integrated basis by local authorities (Perth, Adelaide, Sydney and Brisbane) whilst the commuter services in Melbourne are provided by a private franchisee (Connex).<sup>17</sup>

The privatization of the freight operators has largely been successful, offering better services at lower rates, and generating sufficient internal financing for operating needs.<sup>18</sup> The primary interstate infrastructure provider, ARTC, seems to be an effective conduit for reaching a balance between public and private funding for rail infrastructure. The separation of passenger operations has been effective in ensuring that the freight operators do not have to cross-subsidize passenger services. In particular, GRS has upgraded the quality of the service and is profitable on an operating cost basis. It is not yet clear whether GRS will be able to finance new equipment when that is needed.

Railways in New Zealand were an early target for reform. For many years, the New Zealand railway had been protected from trucking competition by a Government prohibition on long haul (more than 50 km) trucking (traffic was required to go by rail). In the 1980s, the regulations were lifted and enhanced trucking competition began to erode the railway's financial position. In 1980, the railway was carrying almost 12 million tonnes an average distance of only 275 km (well within the range of effective truck competition). By 1990, the tonnage had fallen to a little over 8 million tonnes, and the Government decided that reform (eventually concessioning) was the only hope for survival.

After a rigorous program of reform in government hands, the railway was sold in 1993 for about NZD 400 million. Between 1994 and 2001, the private owners were able to increase freight traffic back to about 14 million tonnes, but apparently did so with deteriorating infrastructure. After 2000, the financial position of the

<sup>17</sup> Franchising of passenger services in Melbourne has been a troubled process that may still be evolving. See Kain 2006 for a detailed discussion. See also Greig, Williams and Wallis 2005.

<sup>18</sup> Greig, Williams and Wallis 2005, page ix.

operator began to deteriorate, and the economic survival of the railway became tenuous.

In 2003, the operator (Tranz Rail) transferred the infrastructure back to the government under an agreement in which the government will take over the financial responsibility for maintaining the infrastructure and the operator will pay an access fee. The operator was subsequently bought by a large Australian freight and logistics group (Toll Holdings) and renamed as Toll Rail. The government had originally thought that an investment of NZD 200 million would be sufficient to rehabilitate the infrastructure to its condition prior to the 1993 sale: more recent evaluations have suggested that the final amount required will significantly exceed this amount.

While the private owners have almost certainly achieved better short-term commercial returns than the railway would have done in public hands the reinvestment of returns in infrastructure was not at sufficient level to sustain it. The ultimate survival of the railway network without significant public assistance is unlikely. This echoes the issue in the EU where governments are finding it difficult to set a target of full financial independence for their infrastructure "businesses."

## 8.4 Japan

Over the 1996-2005 decade, rail freight transport in Japan declined by about 8 percent and passenger traffic declined by about 2 percent.

Japan's railway structure did not change over the decade. In what was by far the largest railway privatization in history in financial terms (the assets involved were valued at over \$300 billion) the old Japanese National Railways had been broken up and privatized in 1987. JNR was broken into six regional monopoly passenger railways, and a national freight railway that has the right to operate over the system of the passenger railways. The three largest railways (JR East, JR West, and JR Central) divide the main island (Honshu) among them, and they control essentially all of the high speed (Shinkansen) lines. Among them, the three carry nearly 95 percent of all passenger traffic in Japan. These three were privatized by sale of their shares between 1993 and 1999 on the Tokyo Stock Exchange, and are now internationally listed. The three smaller railways (the islands of Kyushu, Shikoku and Hokkaido) remain publicly-owned and are supported from a trust fund established at the outset to generate enough income to cover their losses. JR Freight remains publicly owned.<sup>19</sup>

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<sup>19</sup> The freight railway (JR Freight) does not operate on the Shinkansen (high speed lines) but only on the conventional lines that are 1067 mm gauge.

ANNEX A

Table A1. Summary of Major Latin American Freight Concessions

	Km Line		Empl		Ton-Km													CPD Growth% since 1st yr			
	last yr	2005	last yr*	2005	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004		2005		
<b>Argentina</b>																					
FEPSA	5,094	2,560	na	800	633	870	1,014	1,163	1,203	1,290	1,189	897	877	913	1,026	1,156	1,357	1,547	7.12		
Ferrosur Roca	3,342	2,650	na	800			1,026	1,263	1,510	1,641	1,547	1,594	1,263	1,507	1,380	1,641	1,803	1,951	6.01		
NCA	4,512	3,254	na	1,300		946	1,190	1,166	1,398	1,901	2,382	2,444	2,490	2,927	3,436	3,714	3,700	4,156	13.13		
BAP (now ALL)	5,252	3,000	na	1,000		599	2,066	2,310	2,577	3,007	2,712	2,510	2,268	2,055	2,241	2,728	3,018	2,972	3.36		
Mesopotamico (now ALL)	2,739	2,100	na	300			620	690	524	455	447	437	495	412	481	779	844	829	2.67		
Belgrano**	7,352	4,940	na	1,100			747	1,021	1,294	1,541	1,546	1,220	1,268	1,175	880	982	883	808	0.71		
<b>Total</b>	<b>28,291</b>	<b>18,504</b>	<b>28,600</b>	<b>5,300</b>			<b>6,663</b>	<b>7,613</b>	<b>8,506</b>	<b>9,835</b>	<b>9,824</b>	<b>9,102</b>	<b>8,661</b>	<b>8,989</b>	<b>9,444</b>	<b>11,000</b>	<b>11,605</b>	<b>12,262</b>	<b>5.70</b>		
* Estimate based on one-third of the FA labor force																					
** First year not representative																					
*** Not actually concessioned. Transferred to labor union																					
<b>Brazil</b>																					
Centro Atlantico (FCA)	7,221	8,093	10,988	4,799						5,276	7,019	7,417	7,628	8,140	8,600	7,500	8,700	10,700	9.24		
Novoeste	1,621	1,942	2,424	1,199						1,486	1,578	1,625	1,588	1,462	1,700	1,200	1,200	1,300	-1.66		
Nordeste	4,362	4,238	3,707	1,989							640	905	709	701	800	800	800	800	3.24		
ALL (old FSA)	6,785	7,225	9,604	2,371							8,347	9,354	10,285	11,998	12,800	13,900	14,200	15,400	9.14		
MRS	1,705	1,674	9,398	3,624						20,550	21,204	21,823	26,837	27,369	29,400	34,500	35,700	44,400	10.11		
Tereza Christina	169	164	343	236							166	167	259	214	200	200	200	200	2.70		
Bandeirantes (old FEPASA)*	4,651	2,029	13,432	2,584								5,014	5,984	8,278	8,300	9,200	9,500	2,300			
EFVM Vitoria Minas (CVRD)	905	905	3,700	6,015	42,700	45,000	47,000	48,500	50,000	56,600	52,000	55,000	58,000	54,400	57,000	60,500	64,800	68,700	3.31		
EFC (Carajas -- CVRD)	892	892	1,500	3,483	29,900	30,300	31,500	34,500	37,500	41,800	40,400	42,000	45,000	48,000	49,000	52,400	63,600	69,500	6.59		
Ferronorte**	-	504	-	1,702	-	-	-	-	-	-	-	-	-	1,300	1,900	2,100	2,300	8,000			
<b>Total</b>	<b>28,311</b>	<b>27,666</b>	<b>55,096</b>	<b>28,002</b>									<b>143,305</b>	<b>156,290</b>	<b>161,862</b>	<b>169,700</b>	<b>182,300</b>	<b>201,000</b>	<b>221,300</b>	<b>7.51</b>	
* absorbed into Ferronorte in 2005																					
** Absorbed Ferroban in 2005																					
<b>Mexico</b>																					
TFM	4,283	4,029	8,365	3,393									16,902	17,256	19,941	19,208	24,188	28,413	28,626	28,025	7.49
Ferromex	9,124	8,106	19,281	6,105									22,632	23,700	23,964	23,601	29,603	28,220	32,425	35,405	6.60
<b>Total</b>	<b>13,407</b>	<b>12,135</b>	<b>27,646</b>	<b>9,498</b>									<b>39,534</b>	<b>40,956</b>	<b>43,905</b>	<b>42,809</b>	<b>53,791</b>	<b>56,633</b>	<b>61,051</b>	<b>63,430</b>	<b>6.99</b>

ANNEX A

Table A2. Summary of Major Latin American Passenger Concessions

	Track Km		Employees (estimated)		Passenger-Km											CPD Growth% since 1st yr			
	last yr	2005	last yr	2005	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004		2005		
<b>Argentina (Buenos Aires)</b>																			
Belgrano Norte (Ferrobaires)	54	54	na	617		490	540	604	646	632	617	577	496	588	654	685	2.7		
San Martin (Trainmet)	56	56	na	709			831	1,105	1,152	1,217	1,205	1,152	986	747	651	690	761	-4.1	
Belgrano Sur (Trainmet)	66	66	na	613				175	227	283	327	292	312	274	178	199	222	228	0.0
Roca (Trainmet)	261	261	na	2,459	1,515	2,401	2,770	2,919	2,980	2,526	2,472	2,167	1,688	1,695	1,719	1,826		-4.5	
Mitre (TBA)	186	186	na	1,684				1,233	1,434	1,511	1,496	1,456	1,331	1,176	1,231	1,248	1,279	0.4	
Sarmiento (TBA)	184	184	na	1,343				2,220	2,499	2,528	2,498	2,619	2,249	1,976	2,178	2,353	2,448	1.1	
Urquiza (Metrovias)	32	32	na	430	388	401	428	432	443	447	434	390	378	461	490	479		1.3	
Subte (Metrovias)	44	47	4750	2,062	685	749	796	887	1,016	1,041	1,124	1,054	888	914	965	1,013		2.7	
<b>Total</b>	<b>884</b>	<b>887</b>	<b>33,041</b>	<b>9,917</b>				<b>9,319</b>	<b>10,211</b>	<b>10,668</b>	<b>10,138</b>	<b>10,186</b>	<b>9,028</b>	<b>7,526</b>	<b>7,917</b>	<b>8,340</b>	<b>8,720</b>	<b>-0.7</b>	
<b>Brazil (Rio de Janeiro)</b>																			
Supervia (old Flumitrens)	225	225	8,232	2,077						1,908	2,061	2,020	2,210	2,397	2,397	2,471		4.4	
Oportrans (Metro Rio)	31	35	3,272	1,700						406	588	861	865	884	939	1,007		16.3	
<b>Total</b>	<b>256</b>	<b>260</b>	<b>11,504</b>	<b>3,777</b>						<b>2,314</b>	<b>2,649</b>	<b>2,881</b>	<b>3,075</b>	<b>3,281</b>	<b>3,336</b>	<b>3,478</b>		<b>7.0</b>	

## ANNEX A

**Table A3. Australian Rail Freight Traffic (2004/2005)**

A3-1. Million Tons				
For Hire Carriage				
Top 5 Bulk Commodities	Intra-State	Interstate	Private Carriage	Total
Coal	252.9			252.9
Ores	12.4		231.2	243.6
Grain	19.6	0.1		19.7
Other Bulk Commodities	51.5	3.8	44.7	102.2
Total Bulk	336.4	3.9	275.9	616.2
Non-Bulk Traffic	8.7	10.0		18.7
Total Traffic	345.1	13.9	275.9	634.9

A3-2. Billion Ton-Km				
For Hire Carriage				
Top 5 Bulk Commodities	Intra-State	Interstate	Private Carriage	Total
Coal	48.8			48.8
Ores	3.4		78.5	81.9
Grain	5.3	0.1		5.4
Other bulk commodities	12.0	4.6	1.0	17.7
Total Bulk	69.5	4.7	79.5	153.7
Non-Bulk Traffic	4.9	24.5		29.4
Total Traffic	74.5	29.1	79.5	183.1

A3-3. Average Length of Haul (Km)				
For Hire Carriage				
Top 5 Bulk Commodities	Intra-State	Interstate	Private Carriage	Total
Coal	193.0			193.0
Ores	274.2		339.3	336.0
Grain	270.4	571.4		272.5
Other bulk commodities	234.0	1,224.0	22.8	172.7
Total Bulk	206.7	1,200.5	288.0	249.4
Non-Bulk Traffic	567.8	2,446.0		1,572.2
Total Traffic	215.9	2,097.2	288.0	288.4

Australian Heavy Rail Passenger Traffic 2004/2005			
	Passengers (millions)	Passenger-Km (billions)	Avg length of trip (km)
Urban	478.6	8.5	17.8
Intercity	9.1	2.2	240.7

Source: Australasian Railway Association 2005, Tables A3-1, A3-2 and A3-3

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