

THE WORLD BANK

**GOVERNMENT OF INDIA
NATIONAL TRANSPORT SECTOR DEVELOPMENT
POLICY COMMITTEE**

**PASSENGER RAILWAY INSTITUTIONS AND FINANCING:
CHINA, GERMANY, JAPAN AND THE RUSSIAN FEDERATION**

**Paul F Amos
05.09.2011**

A Resource Paper prepared by the World Bank

Contents

Nomenclature	3
Disclaimer	3
Synopsis.....	4
1. Railway passenger services: economic background	5
2. Institutional Framework	8
3. Financing frameworks.....	11
3.1 Overview.....	11
3.2 China.....	12
3.3 Germany	13
3.4 Japan	15
3.5 Russia.....	17
4. Passenger tariff regulation.....	20
Annex A. International comparisons of passenger revenue yield.....	22

Nomenclature

The statistics and commentary in the paper incorporate **long-distance railway services**, **regional railway services** and **suburban railway services**, but exclude metro and tram services. The three railway categories are not defined in exactly the same way in each country, but regional and suburban typically refer to systems which serve commuter and other local travel demands between a major city (or conurbation) and its suburbs and regional hinterland settlements. Most so-called suburban systems therefore extend some way into rural hinterlands and most so-called regional services typically include (and sometimes predominantly consist of) suburban lines. The paper therefore treats regional and suburban rail services as a single category.

Rail passenger service provider is used generically in this Paper to refer to any entity that provides railway passenger train services whether private or publicly-owned, and irrespective of whether the provider is a stand-alone train operating entity or vertically integrated with a rail infrastructure provider.

The term **passenger train operating company (TOC)** refers specifically to a company that runs passenger trains via an access agreement with a company that separately manages the railway network.

Disclaimer

The Paper has been prepared by the Bank's Consultant, Paul Amos. It draws heavily from the Bank's recently published Railway Reform Toolkit, Railways Database, and World Bank experiences of rail reform¹. It has also sourced UIC Statistics and Websites and Annual Reports of relevant ministries and railway companies. However, any findings, interpretations and conclusions expressed herein are those of the author and do not necessarily reflect the views of the World Bank. Neither the World Bank nor the author guarantees the accuracy of any data or other information contained in this publication and accept no responsibility whatsoever for any consequence of their use. The Paper does not endorse any specific country model as being applicable to India.

¹ The Railway Reform Toolkit will be published at www.ppiaf.org/railtoolkit in the near future. Other World Bank resources relevant to the railway industry can be found at: <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTTRANSPORT/EXTRAILWAYS/0,,menuPK:515251~pagePK:149018~piPK:149093~theSitePK:515245,00.html>

Synopsis

This Resource Paper has been prepared for the World Bank for the **National Transport Sector Development Policy Committee** established by the Government of India to advise on the framework for long term development of comprehensive and sustainable transport infrastructure in the country. The Committee requested the World Bank's support in sharing international experiences. Some of the broader information on rail sector governance is contained in a resource paper on Freight Rail Transport and is not repeated here. This Paper focuses on three specific issues in **Rail Passenger Transport**: institutional structure; financing; and fare regulation. It summarizes approaches in four countries which, like India, have a comparatively favourable market environment for passenger rail travel: **China Germany, Japan and Russia**. Nearly 120 passenger rail providers operate in these four countries. The paper finds that:

- In all four countries, governments have articulated the high **social importance** they ascribe to railway passenger services;
- In Germany, Japan and Russia, nearly all service providers are structured as **companies** and are required to operate within a **commercial framework**.
- In China, Germany and Russia the predominant long-distance passenger service provider is **state-owned** but in Germany and Russia this market is contestable by private providers;
- In Germany, the suburban and regional services are operated by both **public and privately-owned companies** and in Russia by **joint-venture companies** owned by the national operator and local administrations.
- In Japan nearly all railway companies in both long-distance and suburban/regional markets are **privately-owned**
- In Germany and Russia, the passenger service providers are **train operating companies (TOCs)** who pay track access charges to a related infrastructure network provider. In Japan they are **horizontally separated but vertically integrated passenger companies** responsible for both passenger services and the infrastructure they use. China's regional rail administrations are **both vertically and horizontally integrated** with regard to passenger services, freight services and infrastructure management.
- Passenger services in all four countries receive some form of **Government financial support**.
- The policy frameworks for passenger railway finance contain **three common features**:
 - long-distance passenger services **fully recover their train operating costs** and make a positive contribution towards recovery of network infrastructure costs (in Japan only a fully commercial contribution);
 - revenue support (which is significant only in Germany and Russia) is intended to be applied to **particular passenger groups or specific suburban/regional systems**, rather than be general in nature;
 - the national budget **supports some major new or upgraded railway infrastructure** of a nationally significant nature.
- All four countries impose some **statutorily-backed fare regulations** but the application ranges from very light in Japan and Germany to moderate in Russia and heavy in China. Greater freedom of fare setting over time is evident, even in China and Russia.
- When adjusted for parity of purchasing power, **Japan has the highest revenue yield** (passenger revenue per passenger-km). **Germany and Russia have lower yields** but of a mutually similar order, while **China has the lowest yield** of the four countries reviewed in this paper.
- **India's average passenger revenue yield**, allowing for parity of purchasing power, is estimated to be about 11 percent of that of Japan, 15-16 percent of that of Germany and Russia, and 37 percent of that of China.

1. Railway passenger services: economic background

Passenger railways can perform a valuable economic and social role in dense inter-city (long-distance) corridors, and also as part of well-integrated suburban and regional passenger transport systems in densely populated areas. 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. High-speed trains, typically using dedicated track on long-distance routes, also compete successfully with airline services in several countries.

The commercial drivers of passenger train services are relatively straightforward. To earn sufficient revenue to meet the threshold of train operating costs requires both **efficient operating costs** (implying close management scrutiny and control over operating resource utilization, particularly rollingstock and staff) plus **strong earnings per carriage-km** (implying high occupancy rates at adequate prices). Assuming the train operating cost threshold is met, to then generate a significant contribution to meeting network infrastructure costs depends on **high aggregate traffic density** on the route, which permits a high number of train movements without undermining load factor of individual trains.

Passenger railway routes providing these conditions are not to be found in all countries, nor found in all corridors of those countries where some favourable routes do exist. There are relatively few routes in the world where passenger train services can be fully commercially viable in terms of meeting the higher threshold of both train operating plus network infrastructure costs. In 2007 the World Bank examined the actual and 'achievable' performance of long-distance routes in markets indicative of ten railway systems in which the Bank has worked². Achievable performance assumed both efficient cost levels and pricing freedoms. Even so, six of the ten railways were found to operate in markets in which they are economically incapable even of recovering the lower threshold of train operating costs from user fares, even if rollingstock capital were ignored. Of the other four, three could also recover rollingstock capital and make some financial contribution to network infrastructure costs. But none could meet a full economic allocation of network infrastructure costs, including capital recovery.

Financing passenger rail services is therefore a challenge to governments throughout the world. When net revenues from passenger services as a whole are insufficient to cover their train operating and network costs, the deficiency can only be made up either by utilizing surpluses earned from freight (a tax on trade and industry), or by government subsidies (a tax on the community); or through under-funding, and so deterioration of assets (a tax on future generations); or some mix of these sources.

Within any railway there are large variations in cost recovery between the different types of passenger service and different routes. However, the range of revenue yield per carriage-km or seat-km shows much greater variation by service type than does the range of cost. Unlike the transport of rail freight, the costs of a passenger train movement for which the train-consist has been determined, is almost independent of the number of passengers using it.

² Paul Amos & Richard Bullock: **The Financial Performance of non-urban passenger rail services.** Paper can be viewed at http://siteresources.worldbank.org/EXTRAILWAYS/Resources/515244-1268663980770/financial_performance.pdf

Railway management should of course attempt to match the size of trains to the general level of demand offering. However, fluctuations in traffic by day of week and time of day mean that there is often much unused capacity even with very efficient operations. And highly peaked regional/suburban services will tend to have much lower yields/carriage-km compared to costs, relative to less peaked inter-city services.

When other things are equal, railways in developing countries face an inherently greater challenge in attaining cost recovery in passenger rail services. The ratio of rail operating costs between efficient railways in high-income countries to those in low-income countries is relatively small, say 2:1 at most (as the cost of many of the inputs, fuel and spare parts are the same in both cases). However the equivalent ratio for income per head may be up to 10:1 and this income disparity clearly affects the affordability of fares. Railways in developing countries must therefore attract a healthy proportion of higher income earners within the country into their customer mix.

The economics of passenger rail operations also mean that low service quality does not necessarily mean low costs. Train crew, energy, station staff, train control costs, maintenance of infrastructure and many other items cost the same (and sometimes more) when service quality is lower. A business strategy overly focused on providing a low quality product at a low fares therefore runs counter to the economics of rail technology which depend on delivering the superior travel benefits the technology can offer to those who can afford it, and pricing accordingly. Naturally, the more successful a company is in providing an attractive travel product at healthy fares the more scope it has for offering cheaper fare options at the margin. But as incomes (and costs) increase, positioning the main role of passenger railways as cheap transport for low income groups is a recipe for mounting financial stress.

This Resource Paper summarizes the transport role and salient features of the rail passenger sector in four countries. Outside India, they represent four of the five busiest passenger railway systems in the world. Of total passenger-kms carried in each country, railways carry around 35 percent in China, just over 10 percent in Germany, 27 percent in Japan and 33 percent in Russia.

Passenger Rail Task – Total rail passenger transport task, long-distance, regional and suburban, (2010)

Scale of passenger transport task	China	Germany	Japan	Russia	India
Pass-kms/year (billions)	876	83	366	139	903
Average trip distance (kms)	523	40	21	147	125

Source: UIC Statistics, Annual Reports of Railways and their governing ministries.

The group contains countries at different levels of development. It includes a developing country (China), a transition country (Russia) and developed countries (Germany and Japan). While India has lower average incomes than any of the four, its income levels are growing rapidly, and the comparators may be a good guide to future rail passenger markets and opportunities for India.

China has the busiest of these four railways. China also has the highest average journey distance (523 kms) partly because it is a bigger country and partly because it has chosen not to provide any suburban railway networks (which would pull down the average). Russia has a more comparable mix of long-distance and regional/suburban services to India's and an average journey distance of 147km. Japan has many long-distance routes but also has extensive and busy suburban operations in all major cities and a high proportion of relatively short trips, so yielding an average journey distance of only 21 kms³. Germany has the European Union's largest and busiest passenger railway, of which about 45 percent of traffic task (passenger-kms) is long-distance and an overall average journey distance of about 40 kms.

³ Japan statistics are for 2009 and include 254 billion passenger-kms for the six JR successor railways and 113 billion passenger-kms for other private suburban/regional railways (excluding metros, light rail and trolleys).

2. Institutional Framework

As was observed in the freight report, all 4 countries have adopted and, with the exception of China, implemented the principle that public policy roles in the rail passenger sector should be separate from role of service provider. Ministries of Transport determine national public interest policies in passenger rail transport in Germany, Japan and Russia, supplemented in all three countries by significant roles for the relevant local government transport administrations for specific suburban/regional systems.

In all four countries, governments have articulated the social importance they ascribe to railway passenger services. Passenger transport is socially important and politically sensitive in all of them. However, each country has pursued this interest in a different way: China basically through ministerial institutions, Japan through a regulated private sector, and Germany and Russia mainly through corporatized state-owned providers coupled with degrees of contestability and private sector participation.

Country	Social Role in Railway Passenger Transport
China	<p>‘A railway transport enterprise must adhere to socialist orientation in operation and management, pursue the aim of serving the people, improve operation and management, improve working methods, and enhance transport service quality.’</p> <p><i>Article 5, Railway Law of the Peoples’ Republic of China, 1991.</i></p>
Germany	<p>‘...transport is to be made environment- and climate-friendly, socially responsible and, at the same time, economically efficient.....We want to shift significantly more traffic to the railways’.</p> <p><i>Policy statement, Federal Ministry of Transport, Building and Urban Development</i></p>
Japan	<p>‘It is deemed crucially important to create a new management structure that can cope appropriately with transport trends and deliver the functions expected of a key transport enterprise in Japan with greater efficiency, thereby helping to stabilize and improve people’s lives and the national economy’.</p> <p><i>Article 1, The Japanese National Railways Restructuring Law (1986)</i></p>
Russia	<p>‘Joint Stock Company Russian Railways (RZD) has been included in the list of open joint stock companies whose shares are owned by the Russian Federation, and the participation of the Russian Federation in management of which is in the state’s strategic interests, promotes its defence capability and security, and protects its citizens’ morale, health, rights and legal interests’.</p> <p><i>Pursuant to Edict No 10009 of the President of the Russian Federation 2004, Concerning Approval of the List of Strategic Enterprises and Strategic Joint Stock Companies.</i></p>

Country	Main railway passenger service delivery institutions
China	<p>Passenger services are mainly provided by the 18 vertically integrated regional railway administrations of the Ministry of Railways. Accounting separation of passenger services has been adopted (though the results are not published). The regional administrations practice a limited form of competition with each other on certain inter-regional passenger routes on the basis of differences in service amenity (as prices are uniform).</p>
Germany	<p>Three main groups of service provider are all train operating companies (TOCs):</p> <ul style="list-style-type: none"> • DB Fernverkehr AG (hereinafter ‘DB Long-distance’): a subsidiary train operating company and business unit of DBAG Group⁴ provides national and cross-border long-distance rail transport services. The company is also establishing and/or acquiring passenger train companies in other countries. • DB Regio AG (hereinafter ‘DB Regional’): a subsidiary train operating company and business unit of DBAG owns many other subsidiary companies operating passenger trains on short and medium distances in Germany. Unlike DB Long-distance it does not operate trains on its own account but under competitively tendered contractual arrangements with either the Bundesländer (Federal States) or their Landkreise (local sub-divisions of Bundesländer). DB Regional also owns 22 regional bus companies in Germany and regional rail franchises in Sweden and the UK⁵. DB Regional is about double the size of DB Long-distance in terms of employees, assets and revenues but carries only just over half the passenger-kms. • Independent passenger TOCs: independents have a share of about 23 percent of the regional contracts (measured by train-kms tendered) but run only a very small number of long-distance services (without subsidy). The largest independent operator is Interconnex, a member of the French Veolia Group, but there are 75 independent passenger companies in total.
Japan	<p>Six main service providers are regionally-based, vertically integrated but dedicated passenger service companies that succeeded Japanese National Railways and collectively known as JR:</p> <ul style="list-style-type: none"> • JR East, JR Central and JR West - separate privately-owned and publicly listed companies • Three smaller companies, JR Hokkaido, JR Shikoku and JR Kyushu are subsidiary companies of the Japan Railway Construction, Transport and Technology Agency (JRTT), a semi-autonomous state admin. <p>In addition there are 21 large and medium-sized mainly private (and a few municipally) owned smaller companies operating mainly in the suburban railway sector (not including the Tokyo Metro). They carry nearly a third of total railway passenger-kms on networks typically in the range 50-200 kms, but some up to 500kms.</p>
Russia	<p>Prior to its current reform program, passenger services were run directly by Joint Stock Company Russian Railways more commonly abbreviated to RZD (a defined ‘Strategic’ company whose shares are owned by the Russian Federation). In 2010 RZD:</p> <ul style="list-style-type: none"> • transferred staff and assets to the newly formed Federal Passenger Company, a TOC, which will manage long-distance rail passenger services; and • completed the establishment of 21 ‘suburban’ passenger TOCs (SPCs) in individual regions, most of them jointly-owned with local government administrations. <p>SPC’s generally correspond to administrative sub-divisions of the Russian Federation. Their aim is transparency of financial performance, eventual elimination of cross-subsidies, and the ability to set locally economically justified tariffs. The policy aim is that local government administrations will either take over the suburban passenger companies or specify service levels and provide any compensating revenue support. At present the local financial contributions for revenue support are relatively low.</p> <p>A small number of private passenger companies have entered the rail market providing premium services and mainly on the Moscow-St Petersburg line. These companies market their own services and own and operate coaches which are hauled by RZD locomotives and crew. The companies have their own station and on-board staff and set their own ticket prices.</p>

⁴ The two main DB passenger companies mentioned are subsidiaries of DB Mobility Logistics AG (DBMLAG) a holding company within the DBAG group.

⁵ In addition another DB company, DB Urban, subsidiary runs numerous urban bus companies and some urban tram operations in Germany while a fourth, DB Arriva, operates a large bus network in London.

In Germany, Russia and Japan virtually all the passenger service providers are companies. In Germany, the dominant long-distance and regional passenger transport operators are separate subsidiary companies of a state-owned corporation, but about 23 percent of total passenger train-kms are operated by independent and mainly private companies (generally concentrated in the suburban/regional sector where they compete with DB Regional and with each other) for public service contracts specified by state/local government administrations. In Russia the dominant long-distance provider is a federally-owned company, and most suburban/regional providers are joint venture companies between federal government and state administrations. In Japan, of the six JR companies (successor companies to the old Japanese National Railways, disbanded in the 1980s), the three largest are private companies and three smaller ones are subsidiary companies owned by a semi-autonomous state administration. The remaining 30 or so providers are mainly private companies or subsidiary companies of conglomerate corporations, though a few are municipally-owned.

Japan and China retain direct vertical integration of services with network management. In Germany and Russia, the largest passenger service providers are not responsible for network infrastructure but are part of larger corporations which are. In Germany and Russia, the main state-owned passenger service providers are train operating companies (TOCs) who pay track access charges to a closely related network provider. In Japan they are part of vertically integrated companies responsible for both passenger services and the infrastructure they use. In China, the regional rail administrations are both vertically and horizontally integrated with regard to passenger services, freight services and infrastructure management. However, China does have a separate accounting procedure for passenger services though its results are not published.

3. Financing frameworks

3.1 Overview

Passenger rail services in all four countries receive some form of Government financial support. The main forms are summarized below.

Main forms of government financial support of railway passenger services.				
Type	China	Germany	Japan	Russia
Compensation for carriage of specific user groups	No	Minor (less than 2 percent of second class revenue on long-distance services)	No	Yes
Specific operating subsidies	No	Contract payments from regional administrations for public service contracts ⁶	No	Contributions towards regional companies from corresponding regional administrations
General operating subsidies	No	No	No	Deficit support of passenger revenue shortfalls during reform process.
Specific capital support	Grants for building new lines to remote areas	Replacement infrastructure investments, set out in a <i>Performance Agreement</i> with govt. Interest free loans and grants towards projects included in the <i>Federal Transport Infrastructure Plan</i>	The fees for rail company use of many Shinkansen (high-speed) lines are set at less than full commercial rates on some lines.	For projects contained in the <i>Federal Target Program</i> . For ‘special’ projects (currently dominated by Olympic projects)
General capital support	No	No	No	Equity injections for maintenance, repair And rehab.
Support from freight services	Freight services pay disproportionate share network costs	No	No	Freight services pay disproportionate share of network costs

The policy frameworks for passenger railway finance contain three common features. First, that long-distance passenger services should cover their train operating costs and make a positive contribution to recovery of network infrastructure costs (though in the case of China and Russia the lion’s share of infrastructure is borne by freight). Second, that operating subsidies should be specific in support of particular passenger groups or service specifications, rather than general in nature⁷. Third, that the taxpayer should support at least some major new

⁶ Contracts include both service and fare obligations

⁷ Although Russia is currently paying general operating subsidies this in the first year of full transparency of the passenger losses and the reform policy is to phase out general subsidies (see text).

or upgraded railway infrastructure of a nationally significant nature (in the case of China this support is currently limited to lines to remote areas⁸ and in Japan, to Shinkansen lines). In other respects policies differ.

3.2 China

The Chinese Government has increasingly required China's railways as a whole to be self-funding. The railway financing framework and funding sources are the responsibility of Ministry of Railways (MOR). This is in addition to MOR's responsibility for railway policy and regulation and for the delivery of nearly all of China's rail passenger services through the Ministry's 18 regional rail administrations. Although MOR is part of the Government, the railway sector of which it is an integral part is not treated as part of the government budget but effectively as a semi-autonomous sphere. China Rail receives no operating subsidies from the national budget for either train or infrastructure maintenance, and only modest support for capital investment for new lines to remote areas—less than 5 percent of current capital funds.

China Rail earns a financial surplus overall but the financial performance of the Chinese passenger sector alone is not published. MOR accounts do not adhere to International Financial Reporting Standards and do not report results by segment. Aggregate performance (passengers and freight) in 2009 is shown below.

China: Financial performance of China Railways (combined freight and passenger services, CNY millions, 2009)	
Passenger revenue	109
Parcels/mail revenue	46
Freight revenue	165
Rail Construction Surcharge ⁹	59
Business taxes	12
Operating Expenses	265
Depreciation	55
Surplus	47

China has not adopted any policy of explicit payments for specific loss-making passenger public service obligations. China does not have the kind of suburban or intra-regional service networks which in many countries constitute the most loss-making parts of a passenger railway business¹⁰ and for which financial performance is reasonable separable. Nevertheless, as in all large passenger railway networks, China will inevitably contain a mixture of more or less profitable services, and some unprofitable services, whether looked at by route or time of day. Different regions also exhibit a range of financial performance

⁸ There are some observers who consider that government will in due course need to assume at least some of the debt involved in provision of high-speed lines but this is not current policy.

⁹ Revenue ring-fenced for capital projects. See text for explanation.

¹⁰ Unlike the other countries in the comparator group, which had mature railway systems in the nineteenth century, China only really started developing a national railway network after 1949 and it has actively discouraged shorter-distance passenger trips from using it.

(mainly related to freight density) and MOR reallocates net revenues between regional rail authorities to ensure financial balance in each.

Freight transport almost certainly finances the greater part of China's network infrastructure operating, maintenance and capital costs. This is unsurprising as freight constitutes about three-quarters of total traffic-kms and comprises markets with capacity to pay that may be more evident than for passengers. Nevertheless, the 25 percent of passenger traffic-kms provides about 34 percent of MOR's gross revenues. Although MOR does not publish segmented accounts, the author considers it likely that passenger traffic as a whole more than covers its train operating expenses and makes a positive financial contribution to network infrastructure costs.

The Rail Construction Fund Surcharge is an important source of funding for major new construction projects and is possibly unique to China Railways. The surcharge has been imposed on the basic freight tariffs since 1990 and generates around 16 percent of revenue. The surcharge revenue is 'ring-fenced' by the Ministry of Finance who administer the Fund. It is not subject to tax and can only be used for major upgrading, new construction and associated debt service. A second, electrification surcharge, was introduced in 1993 for all freight traffic moving on electrified lines and this revenue is used for extending electrification over the network.

In 2005, MOR adopted the so-called joint venture (JV) model to help fund its Mid to Long-Term Development Plan. A typical 'new' JV is funded 50:50 by debt and equity. The equity comes from MOR and third parties—typically provinces and potential customers—and the joint venture will raise the debt from local banks. Often, provincial equity is provided in the form of cleared land (and associated population resettlement costs) but provinces can also contribute funds, normally through a Provincial Rail Investment Corporation. The JV model is now used for almost all new construction and upgrading projects, though regional rail administrations continue to operate the train services and question marks remain about how to get the right balance between railway system co-ordination/integration and protecting the interests of individual JV investors.

China's MOR also raises debt through a number of instruments, the main ones being loans and bonds. Most of this debt is held by China's state-owned financial institutions. The average tenor of such debt is relatively short-term by international standards, much of it in the range 3-10 years. The rapid build-up of such debt to finance the development of the High-Speed Rail network has provoked much comment regarding its sustainability. The burden would be much mitigated if the debt were refinanced over tenors much more appropriate to the long-term nature of infrastructure provision, but it is also possible that the sovereign may in due course also need to absorb part of the debt directly.

3.3 Germany

Within the specific financial framework that has been established, Germany's two main state-owned rail passenger service providers, DB Long-distance and DB Regional, both operate as profitable companies. Their reported financial performance in 2010 is summarized below. DB's segment reporting is drawn up in compliance with International

Financial Reporting Standards (IFRS). The results for DB Regional include a number of foreign-based passenger rail subsidiaries but the overall results in both cases are dominated by those in Germany itself. The financial performance of Germany's 75 private passenger train providers is not readily available but they pay access charges on the same basis as DB and they constitute a growing portion of the market, so their general profitability may be presumed.

Germany: Financial performance of state-owned passenger service providers		
EUR (millions)	DB Long-distance	DB Regional
Revenue from passengers etc.	3952	3286
Passenger Service Contract revenue	0	4273
Operating Expenses	3428	6791
Depreciation	364	490
EBIT	160	656

Source: DB Konzern Annual Report 2010,
(available at <http://www1.deutschebahn.com/ecm2-db-en/ar/>)

German passenger service providers benefit significantly from government financial support, from two main sources. DB and its subsidiary passenger and infrastructure companies are responsible for financing their operations, management and maintenance expenses entirely from revenues. But a major portion of the revenue earned from regional passenger services (whether run by DB Regional or private contractors) is from government funded passenger public service contracts between the regional company and the administrations on whose behalf specific services are run. Moreover, while the track access charges paid by all operators to DB Netz is sufficient to cover the expenses of their operation and maintenance, access income only finances a minority proportion of the capital costs of renewal, upgrading or of new rail infrastructure. Most is funded by government grants and non-interest bearing loans. A third, more minor, source of Federal government funding is payment for trips made by certain community groups.

The German model of concessioning of suburban/regional networks through competitive tender has provided better value for money. According to DB, the Federal Länder (states) now have to spend less public funds to obtain a far higher level of traffic performance in regional rail service than at the start of the rail reform. *'Although the regionalisation funds decreased by six per cent in real terms between 1996 and 2009, traffic performance in the regional rail passenger sector rose by 29 per cent during that same time. After adjustment for inflation, the Federal Länder received 37 percent more performance for each euro in 2009 than they did in 1996.'* (DB Annual Competition Report 2011).¹¹

¹¹ In institutional terms, Germany is judged to have the third most liberalized railway market, after Sweden and Britain, in the assessment of the European Rail Liberalization index which can be viewed at: http://www.deutschebahn.com/site/bahn/en/press/brochures/lib_index/rail_liberalisation_index2011.html

Germany: forms of financial support for passenger rail service (2010)	
Federal payments for travel	Pays for the travel of severely disabled passengers, and military (or alternative) national service travellers. The amount is a very minor portion of passenger revenue.
Federal and Länder payments for regional PSC's	Paid to DB Regional, (or private providers) to deliver specified regional service levels at agreed fare schedules and structures. Most of the funding originates from the Federal level but is channelled through the Länder, or their administrative sub-divisions, who enter into the PSCs. This support represents about 56 percent of DB Regional's total revenue (and 38 percent of combined passenger revenues of DB Regional and DB Long-distance- though the latter is not eligible).
Federal (and to a lesser extent also EU and Länder) grants and Federal interest free loans,	<p>Paid mainly to DB Netz for infrastructure replacement, upgrading and new construction, partly funded from General Account and partly from petroleum taxes:</p> <ul style="list-style-type: none"> • Replacement investments, which are currently set out in a Performance and Financing Agreement signed with DB, valid until 2013 (the Federal government contributes EUR 2.5 billion/year, while DB provides additional funds of at least EUR 500 million from its own resources) • New-build and upgrading projects are stipulated in Federal Transport Infrastructure Plan (though detailed agreements are case by case) and financed by the Federal government mainly as construction grants and interest-free loans. DB contributes funds of its own towards such projects insofar as they are in its own business interests (and has contributed around 15-20 percent of total). Over the last few years, the Federal government has contributed an average of EUR 1.2 billion/year to new-build and upgrading projects.

Additional government support to DB companies is also given through borrowing guarantees. This includes explicit sovereign guarantees for loans from Eurofima, a company set up by a number of European railways to finance purchase of railway rollingstock. Because DB is 100 percent owned by the German Federal Government, capital raising by the DB Group is also assisted by market perception of an implicit government guarantee on bonds issued by the DB Group's financing company, DB Finance, (which acts for the group as a whole).

DB Finance also raises debt for its own portion of investment in infrastructure through loans and bonds. As at end December 2010, DB Group's total debt of EUR 18.553 billion consisted of Bonds (64 percent), Federal loans¹² (16 percent) finance lease liabilities, mainly for rollingstock (8 percent), and Eurofima loans (also rollingstock) and bank loans (each 6 percent).

3.4 Japan

Japan's passenger railway sector is operated by private companies according to commercial principles. The three major, privately-owned, JN companies must fully cover the train operating and network infrastructure costs of their operations with commercial revenues, and finance their own capital programs¹³. They seek to earn profits consistent with their Board and shareholder expectations but subject to a government oversight of the

¹² repayable but mainly non-interest bearing.

¹³ However, at the time of their establishment, they assumed only part of the old Japanese National Railways (JNR) liabilities and to the extent that it would not impede the viability of the new companies.

‘appropriateness’ of the relation of tariffs to costs in the rail transport part of their businesses. They receive no revenue subsidies from the Japanese Government and must finance their own infrastructure development programs, though special provisions apply to the development of the Shinkansen Network (see below). Most of the companies have diversified into a wider range of non-railway (and non-transport) businesses. They include, but are certainly not limited to, businesses based on use of railway property and air-rights. The many non-JR companies generally earn an even greater share of revenue from non-transport businesses.

Although commercially independent, the Japanese Government imposed a number of general obligations on the JR passenger railway companies. At the time of reform of JNR in 1986, a system of cooperation, linkages, and other interactions was established between the successor JR passenger companies, and between them and the freight company, on the basis of a number of perceived public interests. This framework was later reinforced by the re-specification of a number of matters that companies must take into account in conducting their business operations including (a) appropriate setting of passenger fares and rates structure, facilitation of smooth inter-company transfers by passengers and coordination and cooperation (in the railway business) between the Companies; (b) maintenance of the currently operated railway routes with due notification and process if line closure is envisaged or stations and other railway facilities are to be developed; and (c) consideration of the impact of company diversification plans on small and medium-sized enterprises engaged in similar business in the same areas to avoid unfair impact¹⁴.

Japan: Financial performance of East Japan Railway Company (consolidated results, JPY billions, 2010-11)		
Main business activities	Gross revenue	Operating income
Transport (railways, bus service and monorail)	1721.9	227.1
Station space utilization (retailing, restaurants etc)	385.8	31.3
Shopping centres and offices (158 buildings)	223.2	64.2
Other (advertising, hotels, credit card etc)	206.2	23.0
TOTAL	2537.1	345.6

Source: East Japan Railway Company at : <http://www.jreast.co.jp/>

The financial performance of the largest JR passenger company, the East Japan Railway Company, is illustrative of the financial structure of the passenger railway industry in Japan. The company (the largest private passenger rail operator in the world) manages the rail network and operates services in the northern half of Japan’s largest island of Honshu, including services in the Greater Tokyo Area. In 2010-11 it carried about 130 billion passenger-kms/year (just over a third of Japan’s total) on a network of around 7,500 route-kms, including both conventional and (just over 1,000 kms of) Shinkansen lines. East Japan Railway Company is a diversified business earning a positive net operating income of JPY 345.6 billion on gross revenue of 2537.1 billion (that is around 14 percent) before interest, tax etc. Of this operating income around two-thirds is earned from transport (mainly railways but including bus services and the Tokyo monorail), 9 percent from commercial exploitation of its own stations, 18 percent from other shopping and office centres, and 9 percent from

¹⁴ Details of these obligations are set out in a Ministry of Land, Infrastructure and Transport policy document available at: http://www.mlit.go.jp/english/2006/h_railway_bureau/Laws_concerning/12.pdf

various ancillary businesses. The company has 75 subsidiaries in all (for example, each of its 25 shopping malls is managed by a separate subsidiary).

The financing of Shinkansen lines is subject to specific legislation. The Shinkansen Development Law was adopted in 1970 after the success of the first Tokaido Shinkansen, a 515 kms high-speed passenger-dedicated line that opened in 1964. This first route was a financial success and by 1967 revenue exceeded operating costs, including interest and depreciation. The Law set out a blueprint for a high-speed network of some 7,000 route-kms. The system was steadily extended: to Fukuoka in Kyushu (1975); to Morioka in northern Honshu (1982); and to Niigata on the west coast (1982). But the succeeding Shinkansen lines, while generally earning sufficient to cover operating and maintenance costs, were less heavily used and able to contribute little towards capital recovery. Shinkansen-related debt was JPY 5.7 trillion by 1987 when, partly because of this unsustainable burden, Japanese National Railways were wound up. The companies that succeeded it, such as the East Japan Railway Company, were relieved of a significant portion of this debt.

The capital cost of New Shinkansen railway construction projects is now shared by the national government and local governments along the railway lines. Two thirds of the funds are from the national government and one third from local governments. The railways are constructed and owned by JRJT and managed and operated by the companies. JRJT charges the passenger railway companies for the use of this infrastructure (the East Japan Railway Company paid JPY 78.5 billion in usage fees to JRJT in 2010-11), but the maximum charge that JRJT can levy is equal to the profits from the new Shinkansen operations. Therefore decisions to build new lines involve a detailed appraisal of the impact on the profitability of the railway company. A little more than half of the national government funding comes from the payments received from companies for use of existing Shinkansen lines while the remainder comes from the Japan's General Account.

3.5 Russia

The Russian passenger railway sector is at a point of transition in a long-term reform program adopted in 2001. The program was designed such that, over a period of about 10 years, it would convert the Russian railway sector from the wholly vertically and horizontally integrated structure inherited from the Soviet Union to one based on commercial, corporatized structures focused on specific business activities, private sector participation in train operations, and the gradual elimination of internal cross-subsidies between the business segments¹⁵.

This year, 2011, will be the first year in which all previous RZD passenger services will be managed by subsidiary and joint venture companies of RZD. Henceforth the previous RZD long-distance and international services will be operated by a wholly owned subsidiary, the Federal Passenger Company, and regional/suburban services by one of 21 geographically-

¹⁵ Further details of Russia's railway reform program is given at:
http://eng.rzd.ru/isvp/public/rzdeng?STRUCTURE_ID=23

based suburban¹⁶ passenger companies, jointly owned by RZD and regional administrations. RZD plans if possible to divest these suburban passenger transport companies, though the shape of that planned divestment is not yet clear. The reform program can be said to have now reached the stage of revealing the extent of accounting losses rather than eliminating them or establishing the planned long-term mechanism of local funding.

Russia: Reported financial performance of RZD Passenger Services, 2010				
RUR (billions)	Federal Passenger Company¹⁷	RZD Long-distance services	Suburban/regional passenger companies	RZD Suburban/regional services
Revenues ¹⁸	136.1	29.1	29.1	13.8
Expenses	157.7	52.0	33.1	42.9
EBIT	-21.6	-22.9	-4.0	-29.1

Source: derived from RZD Annual Report 2010,
(available at http://eng.rzd.ru/isvp/public/rzdeng?STRUCTURE_ID=4)

Russian passenger services are currently earning accounting losses, but long-distance services as a whole probably contribute positively to network infrastructure costs. The table above shows 2010 reported results during the transitional year in the course of which responsibilities devolved from RZD itself to subsidiary companies. The expenses shown include an allocation of network infrastructure costs levied as a track access charge. The segment reporting is not necessarily drawn up in accordance with IFRS. However, taking results at face value they suggest broadly that long-distance services cover about 80 percent of their fully allocated expenses and suburban/regional services about 56 percent of fully allocated expenses¹⁹. If so this would imply that long-distance services cover their train operating costs (which would be expected to be less than 80 percent of the total costs) and make a modest positive contribution to infrastructure network costs, while suburban services as a group do not even cover train operating costs.

RZD passenger services receive several forms of financial support from the Russian Federal Government and modest contributions from regional administrations. Revenue support of various kinds appears to have been about RUR 41 billion or just over 15 percent of the total income of the RZD companies and subsidiaries. There is also capital support of passenger railway links in preparation for the 2014 Sochi Winter Olympics and for a new airport link in Vladivostok (these categories of support are clearly of a special and short-term nature). Finally, passenger services will have benefited to some extent by federal support of around RUR 39 billion to rail network infrastructure in 2010 though rail freight, which constitutes around 90 percent of traffic-kms in Russia, is likely to have been the main

¹⁶ Although RZD refers to these as suburban services, they represent networks that extend long-distances into rural hinterlands and include what would be known elsewhere as regional networks.

¹⁷ During 2010 the remaining RZD long-distance services (mainly international services) were also transferred to the Federal Passenger Company and the remaining RZD suburban networks corporatized.

¹⁸ Excluding general revenue shortfall subsidies (see below for summary of subsidies).

¹⁹ Indeed the cost coverage for Russian suburban/regional services look very similar to those which would obtain for DB Regional's services in Germany if the latter did not receive contract payments from local authorities.

beneficiary. The financial contributions to special projects and infrastructure were provided as equity injections. These funds are provided to help fund the rail projects defined in a Federal Target Program²⁰ but the actual level of funding currently provided for rail infrastructure is thought to fall far short of what is required to deliver the Program.

Russia: main forms of federal financial support for passenger rail service (estimates based on 2010 Financial Statements)		
Type of support	Items	RUR (billions)
Revenue support for travel concessions	• Compensation for loss of revenue for harmonization of tariffs from Kaliningrad ²¹ to and from other regions of Russia.	0.02
	• Compensation for transportation of students of higher and secondary education institutes	1.4
Revenue shortfall suburban/regional	• Compensation to RZD and suburban passenger companies for shortfall of revenue	3.9 ²²
Revenue shortfall long-distance	• Compensation for shortfall in revenue of long-distance passenger services of RZD	9.1
	• Transfer for revenue shortfall to Federal Passenger Company	26.7
Implementation of Public Passenger Projects	• Development of rail transport for venues for the 2014 Sochi Winter Olympic Games	80
	• Intermodal passenger link between Vladivostok and Knevichy Airport	3.6
Direct contributions to infrastructure ²³	• Maintenance/repair	19.1
	• Rehabilitation and reconstruction	20.0
	• Security and protection of public infrastructure	2.6

RZD raises debt for its own funded investments through loans and bonds. As at the end of 2010 total debt is reported as RUR 297.6 billion consisting of RUR denominated bonds (63 percent), Euro-denominated bonds (15 percent), project finance (11 percent), syndicated loans (8 percent) and bilateral loans (3 percent).

²⁰ Decree no.377 'On Federal Target Program-Modernization of Russian Transport System (2010-2015)

²¹ Kaliningrad region is separated from the remainder of the Russian Federation by the territory of EU Member States.

²² Includes contributions of federal and local administrations.

²³ Some part of the benefit accrues to passenger services but it is probable that the main beneficiary of this category of support is rail freight transport

4. Passenger tariff regulation

All four countries impose some statutorily-backed fare regulations on their passenger rail services. This clearly reflects the high social and political sensitivity of passenger transport fares in all the countries, irrespective of political system. Even in Germany, where there is substantial commercial freedom to set fares, the government has approving authority for general fare increases and the Bundestag (parliament) regularly scrutinizes rail fare proposals.

Country	Passenger fares regulation
China	Heavily Regulated. State Council has complete regulatory powers, but has granted more flexibility in recent years to reflect wider range of service qualities.
Germany	Very lightly regulated. Federal government must approve conditions of carriage including standard fare but policy is that long-distance markets should be regulated by competition. Suburban/regional fare regulation differs by concession.
Japan	Lightly regulated. Maximum fares must be approved by Minister of Transport, and companies must coordinate fares and ticketing systems to allow smooth transfer between companies at non-discriminatory fares.
Russia	Regulated. Federal Tariff Service regulates domestic long-distance fares but since 2009 has granted independence of pricing for premium travel classes and trains.

In China centralized government control of prices was adopted when China's railway system was consolidated as a unified system after 1947. Under the 1991 Railway Law, passenger fares proposed by MOR must be approved by the State Council. This responsibility is administered by the National Development and Reform Commission (NDRC), the State Council's macro-economic management agency. NDRC regulates all China Rail (CR) tariffs as well as those of inter-Provincial joint venture and local railways. As a result of policies adopted after public hearings hosted by SPC in 2002, MOR could adjust CR's passenger fares in special periods (such as holidays and Chinese New Year) within a certain range. With more intense transportation market competition, special pricing policies and flexibility has been granted for certain train categories such as high-speed train services.

In Germany, the federal government has formally to approve increases in the standard railway fares (and changes in conditions of carriage) charged on long-distance route. However, it does so within the context of the objectives set out in the General Railway Law that the railway industry is open to effective and undistorted competition (Article 1) and that railway companies should be operated in a commercial or business-like manner (Article 3). Therefore, in practice fares are generally approved as a commercial decision of the companies involved and the practical regulation is very light. Suburban and regional concessions contain a mixture of contract types, some in which fares are specified and others in which operators

have freedom, but even in the latter cases there is normally some restriction on maximum fare increases.

In Japan, ministerial approval of JR maximum fares is required and companies are obliged to adopt co-ordinated structures that enable smooth inter-ticketing and travel across Japan. Companies are required to notify and gain approval of the Minister of Land, Infrastructure and Transport of the upper limits of fares to be charged and in considering proposals the Minister must take account of the level of fares in relation to efficient costs plus ‘appropriate’ profits. The Minister can also order changes if the charges discriminate against certain classes of passenger or if the charges may cause ‘unjust’ competition against another railway. In addition to general co-ordinating mechanisms in setting and administering rail fares, when transfer between companies is required companies are obliged to set fares to take account of the total distance and to taper the fare accordingly. Common ticketing rules mean passengers may travel across several JR companies without changing trains and without purchasing separate tickets. The companies share an integrated reservation system.

In Russia, the Federal Tariff Service (FTS) has strong regulatory powers but has granted much greater freedom and now effectively only regulates non-premium tariffs. FTS is responsible for regulating charges and fees for services which involve transport of passengers by long-distance trains on Russian domestic routes, and the operation of passenger cars, whether by RDZ or private operators. However, in accordance with Decree No.643 of the Russian Government (August 2009) the FTS has granted RZD and the Federal Passenger Company the right independently to establish tariffs for long-distance services in first-class sleeping cars, compartment cars of all trains and all seats on high speed trains.

Annex A. International comparisons of passenger revenue yield.

Average tariff levels can be estimated in a very simplified way by reference to the average revenue yield; that is farebox revenue per passenger-km. The table below provides estimates of these yields in 2010, derived from Annual Reports of the companies concerned that provide estimates of revenue and passenger-kms. The yields are brought to a common basis of USD rates using currency exchange rates as of 30 August 2010. Because of the disparity in income levels between the countries, the results are also shown in USD adjusted for Purchasing Power Parity²⁴. When adjusted for parity of purchasing power, Japan (which receives no revenue subsidies) has the highest farebox yield, Germany and Russia have lower yields but of a mutually similar order, while China has the lowest yield of the four countries reviewed in this paper. For comparison purposes, India's average passenger yield, also adjusting for parity of purchasing power, is about 11 percent of that of Japan, 15 percent of that of Germany and Russia and 37 percent of that of China.

Average passenger farebox yield per passenger-km (2010)			
Country	Yield/pass-km (local currency)	Yield/pass-km (USD)	Yield/pass-km (USD PPP)
China	CNY 0.15	0.024	0.038
Germany ²⁵	EUR 0.09	0.126	0.087
Japan ²⁶	JNY 14.61	0.190	0.132
Russia ²⁷	RUR 1.50	0.052	0.094
India	INR 0.26	0.006	0.014

²⁴ Purchasing power parity conversion factor is the number of units of a country's currency required to buy the same amounts of goods and services in the domestic market as U.S. dollar would buy in the United States. Rates used are as recommended by World Bank for 2010 values.

²⁵ German estimates are for DB long-distance and DB Regional combined but exclude non-fare income from concession contracts.

²⁶ Estimates are for JR companies and private companies combined.

²⁷ Includes both RZD (Russian Railways Corporation) and its subsidiary Federal Passenger Company, plus jointly-owned regional/suburban passenger companies. Excludes revenue shortfall income provided by the Russian government.