

Evolution and Revolution—The Changing Focus of Regulation of the World's Railways

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Introduction

This article provides an overview and perspective on the regulatory changes sweeping through the world's railways. It concentrates on railways in the relatively wealthy countries, primarily because they are the vanguard, where a century or more of management practice and government controls are undergoing change. We begin with comments on the nature of rail technology and markets, the implications for government and public policy direction, and forces of change that have pushed railways internally and externally into new organizational and regulatory structures, most of which are still evolving. The latter part of the article comments more specifically on changes taking place in several countries.

Rail Technology, Operations, and Evolution of Public Policy

The long-standing intimate link between railways and public policy are explained primarily by two things: the economics of railways; and politics.

Railway economics

Railways embody a number of technical and operating characteristics that have important economic implications. Railways supply an extraordinary array of services, typically over a large number of origins and destinations. Rail production is relatively capital intensive, especially provision of way and structures, but much of the rolling stock is long lived as well. The great variety of outputs produced by shared resources and facilities makes it difficult to determine the costs of specific services. Even today, with detailed databases and activity-based costing, many cost allocations remain ambiguous. The difficulty of price-cost comparisons was a compounding factor in controversies regarding monopoly power of railways.

There is a second practical distinction about rail markets that is important in understanding the origins and persistence of public policy in rail decisions. This is whether or not passenger services are supplied. Their importance is primarily because they bring greater political awareness than does the freight carriage, not that the latter is unimportant. Put bluntly, passenger services bring greater political interference with rail decisions, and money-losing operations.

Politics and railways

Throughout the world, the rail industry has been accorded special strategic significance by government—there is a greater propensity for government intervention in rail matters compared to most other industries. In part, this reflected economic efficiency concerns regarding the regulation of monopoly power, but also reflects a strategic policy role for railways as a tool for economic and political integration of regions. This was especially relevant in the late 19th and first half of the 20th century when railways were the dominant carrier of freight and passengers. Given the public interest in railways, this meant that channels of influence were established by governments, in turn meaning that railways tended to become a tool for all manner of political intervention, from favouring certain groups or commodities to use as anti-inflation measures. The efficacy of some of these policies was dubious, but politicians use whatever tools are available.

Political interference is particularly important for railways with extensive passenger service. Passengers vote (so do shippers but somehow their votes carry less influence), and perhaps for this reason, rail passenger services rarely are financially viable. The lack of commercial incentives to serve passengers requires that a railway be administered by rules and regulations because normal commercial incentives do not exist. This

furthered the need for government intervention, either by regulation or, more typically, by government ownership and operation of railways. Profitability could not be the focus for many of the world's railways, so 'running the trains' was the measure of business success rather than profitability. This is the key difference between North American railways and practically every other railway in the world. The North American carriers became almost exclusively commercial freight railways, leaving a shrinking passenger market to be operated (by government entities) separate from freight operations.

From the mid to late 20th century, a number of forces acted on railways and governments, and set a number of organizational experiments into motion, most of which are still underway.

Forces Affecting World's Railway Industries

Technological change and rise of competition

One of the dominant characteristics of the 20th century is the sustained technological advance, and transportation innovations were a central part of this. 'Friction of distance' has declined markedly. This brought about unprecedented travel and transport, enabling specialization and trade, which are a major factor in our economic advance. (The declining friction of distance and increased mobility also have adverse consequences in facilitating wider human conflict and now global environmental deterioration, but these problems are not discussed here.)

Railways have made major technological advances, but basically they were a victim of rising competition. New modes of transport have displaced the dominance of railways. First, in North America but then spreading elsewhere, the car and air travel now dominate passenger travel, and the truck dominates freight except for a

few bulk commodities. Rail passenger travel remains important in large urban areas (where motorized transport is not feasible for the numbers involved), in short-haul high-density markets (Europe and Japan), and in countries where personal incomes are low and government subsidies sustain rail operations. Rail subsidies are prominent in virtually all passenger operations. Japan is a notable exception with some very high passenger densities and high fares, but also low density services as well.

Although there is intramodal rail competition in a few places, notably in North America, the primary competitive forces are intermodal competition and 'market competition'. The latter refers to competition in the market place for the goods being carried. For example, coal shipments tend to be 'rail captive', but markets for coal are competitive and this limits the prices that railways can charge. Still another example is competition between logistics chains. Containers from Japan to the eastern USA can move to different ports (west and east coast) and by different rail systems. Car buyers in Chicago can be supplied by Japanese or European

manufacturers and the corresponding supply chains. Competitive rail freight markets have enabled deregulation in these markets. Because rail passenger markets are less competitive (usually not commercially viable), this has limited the workings of market forces, but significant innovations and modifications to market structure are emerging.

Disenchantment with government and movement to deregulation

Following the Great Depression and WWII, there was a significant expansion in the size and roles of government in the economies of all the democracies. This enjoyed widespread support and was characterized by the rise of social programmes and greater regulation of economic activity. But certainly by the 1970s, there was a growing disenchantment with the performance of government intervention in economic affairs generally, but especially via restrictive regulations. Not only railways, but most transport modes in most countries evolved under fairly rigid regulatory environments. Arguments for deregulation arose in academic circles at first, generally opposed

by industry and government, but the idea caught on, particularly as evidence on performance differences in regulated and unregulated markets came to light.

The first significant rail deregulation was in Canada, which granted the railways pricing freedom in the 1967 National Transportation Act. The subsequent strong productivity performance of Canadian railways relative to their US counterparts influenced the subsequent (and more sweeping) US rail deregulation (via the Staggers Rail Act of 1980).¹ Regulatory reform and/or reduced government ownership and control are now taking place in other countries, and tend to be different than in North America.

Railways, like telecommunications firms, use sunk capital assets to connect spatially-separate markets. This capital intensity can provide substantial market power to an incumbent firm. Competitors must face risky major investments, or purchase access rights from the incumbent, who in turn, is a competitor. Regulation of access, or divestiture of ownership/control over such sunk assets is a major focal point of regulation in both telecommunications and railways.



Redfern Station in Sydney

(Authors)

Recent Developments in Rail Organization and Regulatory Reform

The traditional regulatory model (or government ownership and control) involved direct regulation of prices. Rate structures evolved with a mix of cost recovery, cross-subsidy and a hodgepodge of often conflicting equity and efficiency goals. Conflicts between shippers and carriers were resolved through a legal regulatory process or direct lobbying of government-owned railways. While not efficient, just about any rate structure could prevail during a monopoly era. But the rise of competition gradually undermined at least part of such rate structures, especially the profitable parts. As is well known, railways tended to lose high-value traffic while retaining much high-cost low-value traffic. Most countries responded to the rise of competition by suppressing or regulating it.

The last two or three decades have seen waves of change sweep through rail industries throughout the world. In North America this has been both through deregulation of rail companies and by relying primarily on competitive forces. Some residual regulatory controls remain in Canada and the USA, but they are inconsequential in comparison to traditional regulatory structures. Other countries, most of which have had government-owned railways, are also trying to reduce or greatly modify government control over the industry. Recently, several countries have embraced an old but radical idea to alter the structure of the rail industry—separation of track ownership from rail operations. This is an alien idea to traditional rail management. Traditionally, railway decision making is very operations-oriented. There is the necessity of controlling car and wagon movements on the track, and the tradeoffs between track investments, maintenance policies and train running costs. Rail

operators have long believed that vertically-integrated management is necessary to maintain system integrity and efficient decisions. But the consequence is that rail companies have substantial fixed and sunk costs in infrastructure, constituting a significant barrier to new entrants and thus discouraging competition. The contrast with motor carriers has long been recognized—trucks make use of public roads, which are a variable cost to the trucking companies. (There is a further issue that usage charges do not reflect the full costs.) Separating track ownership from operations offers the possibility of competition between train operators, even on relatively 'thin' routes. Competitive bidding for specific services on the latter might even bring about reliance on competition for monopoly routes.

A number of countries are pursuing new track ownership and organization in the rail industry. If an incumbent railway retains ownership, there is growing emphasis on allowing access to these facilities by would-be competitors. (This is also an issue in telecommunications, an industry with the same importance of fixed infrastructure in offering services to customers.) The concepts of granting access to fixed facilities and fostering competition are consistent with the broad trend of reducing the role of direct government control over transportation (and other industries). Aside from organizational issues, a major controversy is over appropriate pricing of access. In effect, traditional vertical integration means that the pricing policies of rail management would be determined by track charges recouped on a differential basis from various traffic. Relying instead on granting access to different carriers to the same track requires some *ex ante* price of access. This requires allocation of traditionally unallocatable costs, and agreement on cost-recovery targets and the extent to which access prices can vary

among operators.

The fundamental issue is access rights to rail track infrastructure. Open access to rail track requires a right to move trains over a track section in some well-defined way. The allocation process is essentially an allocation of the track *capacity* to carry train movements. Such movements can range from a complete train to space allocated on a specific wagon over a specified time period. Capacity is subdividable, even when track is indivisible. This suggests that the indivisibility problem would disappear if rail access rights are defined as a right to some movements per some agreed unit of time.

This open access interpretation obligates the rail access company to supply movement 'slots' over its right of way and track.² The company may retain some of its track capacity to move its own trains, contract out some movements, and possibly place the remainder in a spot (or auction) market. When the access company is itself a track user as well as a competitor with open access entrants, there is the potential for anti-competitive practices against third-parties. In this case, an established pricing regime (and/or an effective regulator) are required to ensure that there is no discrimination in favour of the access company. The slot concept is relatively straightforward, although there are many practical issues such as resolving traffic control priorities in operations (meets and passes).

The jury is still out on whether or not this reorganization can lead to workable competition and efficiency gains, but even the most sceptical are anxious to see how these experiments work, because this system offers the potential to reform and rejuvenate one of our oldest industries. Another regulatory framework has had limited application to railways, although it has been embraced by telecommunications and other monopoly services; this is price cap regulation. Instead of extending regulatory control over individual

prices, this approach merely 'caps' overall revenues, allowing management discretion over individual prices. The idea is that managers are aware of market conditions and better appreciate which markets can bear what level of charges. Varying mark ups over variable costs, or differential pricing, is an economically optimal strategy up to the point where monopoly profits are earned. (This is called Ramsey Pricing.³)

The second feature of the price cap approach is that it focuses regulation primarily on the rate of price increase over time rather than the structure of prices at a point in time. Firms must increase prices to deal with input price inflation. Even if a firm were not earning monopoly profits at a point in time, productivity gains would enable the firm's profits to grow even if they were only raising prices in line with inflation. Hence the price cap regime limits the average price increase to the rate of price increase (RPI) minus x , where x is the prescribed productivity gain. This ensures that productivity gains are shared with customers, and there is an incentive for efficient behaviour because the rewards of still higher productivity growth are retained by the firm. The concept of a productivity adjustment to regulated rate increases has been adopted in North America, but there the price cap is applied to specific rates rather than only on an aggregate basis.⁴

Regulatory Reform and Restructuring in Selected Countries

Railways in many countries of the world are going through radical change, but most are quite different from the North American experience. There are a number of reasons for this difference. Many other countries have a history of government ownership of their railways and have substantial passenger operations with attendant financial losses. Many



Light rail in Sydney

(Authors)

countries in Europe and elsewhere still see a strategic role for railways as a preferred alternative to motor transport with its high energy requirements and pollution costs. The desire for efficiency and a belief in the benefits of competition are motivating policy outside North America too, but it is taking quite a different form than the North American experience of competing rail systems. Outright privatization is not feasible for systems with substantial money-losing operations. Nonetheless, there are innovative ways of involving private management and capital by using various contractual arrangements.

North American Approach

The Canadian and US railways are very similar in operations and commercial orientation, although there are some important structural differences. In the USA, a historical preference for competition and distrust of monopoly made it difficult for railways to extend their territory. As a result, the US Class-1 carriers operated a patchwork of rail lines across the country. In contrast, the Canadian Pacific Railway and Canadian National Railway Company

(CN) were nationwide systems, including extensions into the USA. The government-owned CN (privatized in 1995) operated with substantial independence, but both countries had regulatory bodies that regulated rates. Noting the rising competition facing railways, Canada granted substantial pricing freedom to railways in 1967, which led to an even stronger commercial orientation than before.

Although still efficient by world standards, by the 1970s, the US rail industry was stagnating with low productivity growth and a gloomy financial picture. Starting in the mid-1970s, a series of regulatory reforms culminated in the Staggers Rail Act of 1980. Although there are still some residual regulatory provisions, for the most part the American railways have been free to restructure and compete. The restructuring has been both substantial and paradoxical. The Class-1 carriers have simultaneously downsized and merged. Large carriers became larger as they extended their reach to serve wider networks. At the same time, a substantial number of feeder lines were either closed

or sold to short-line operators. These were partly 'union busting' measures to persuade rail workers to accept greater flexibility, but also reflected modern management strategies to concentrate on core business (large volume, long haul) and rely on more responsive smaller carriers to provide feeder services. For the most part, the US rail industry has done well since 1980. Productivity growth is substantial, and finances have improved.

The USA has taken few steps regarding facilitating track access rights. The merger movement of 'end-to-end' railways has caused concerns about the foreclosure of running rights granted formerly. There are also residual regulations concerning captive shippers. For example, the maximum freight tariff is limited in principle to the so-called 'stand-alone costs,' which are the amount it would cost the shipper to move the goods himself, and allowing combination with other available traffic in calculating the full carriage costs. This regulation does not foster competition in these captive markets. In contrast, Canada no longer has regulatory protection for captive shippers, but does provide for the right of such shippers to invite other railways to bid for their traffic and carry it over the access railway's track at prescribed competitive line rates (CLRs). In an attempt to promote competition, the Canadian legislation effectively undermines some property rights of the incumbent or serving carrier. However, thus far there have been very few CLRs because railways seem reluctant to encroach on each other's territory.

UK Approach

The privatization of British Rail under the 1993 Railways Act involved a mixture of franchising and deregulated sale of assets and operations. The previously unified national railway was restructured into over 100 separate companies, including 25 passenger Train Operating Companies (TOCs), the infrastructure company

Railtrack, six rail freight companies, three rolling stock leasing companies (ROSCOs), plus other companies covering maintenance, engineering and other support services. During 1995–97 all passenger services were franchised to private sector operators, while all other companies were sold outright to the private sector. Railtrack is required to cover all costs, primarily through charging train operators for the use of the network.⁵ Operators are expected to procure new rolling stock through the incentive of lower operating costs or higher revenues, with the investment being funded by the ROSCOs. Infrastructure is enhanced through deals negotiated between Railtrack and the TOCs.

The Railway Regulator licenses operators, regulates charges and access to the network and sets the basis of competition. Passenger rail services are under the control of the Office of Passenger Rail Franchising (OPRAF), which issues contracts to provide passenger rail services via competitive tendering to the private sector. These franchises run for between 7 and 15 years. Overall, the level of regulation is fairly minimal for the ROSCOs and engineering and freight companies, but is extensive for passenger services.⁶

The regulation was designed to safeguard existing rail services and customers. There have been some additional directives since 1997 to actively encourage use of rail passenger transport. These new guidelines obscure the boundaries between the Office of Rail Regulation (ORR) and OPRAF, limiting the powers of the Regulator as an independent champion of the public interest.

Track charges are designed to cover Railtrack's total costs and to promote full utilization of the existing network and future investment. There are 'negotiated' charges for commercial traffic, and 'administered' charges for subsidized passenger services. Although economic principles have been followed in ensuring

that charges at least cover avoidable costs, the initial charges appear to vary too little to ensure efficient use of existing capacity.⁷ The UK model involves a high degree of vertical and horizontal segregation to provide competition both in functions (rolling stock leasing, maintenance, etc.) and services. It is a bold experiment and it is too early to pass judgement on its performance, but just managing to get the structure established and operating surprised some sceptics.

One concern for the future is the risk of underinvestment. Since the current franchise periods are 7–15 years, investors will want profits over that time scale, even if the life of assets is actually longer. In addition, Railtrack uses a relatively high discount rate of 8%. Another problem will occur if enhanced services on additional capacity are not profitable, but have social benefits. In this case, OPRAF will have to estimate the value of the benefits and pay the operator accordingly. It may also have to give commitments to employ the new rolling stock or infrastructure beyond the life of the franchise. Moreover, the benefits of any particular infrastructure may be split between a number of operators, which may reduce the incentive of anyone taking the lead in pursuing proposals.

Ultimately, the question of interest is the potential savings in subsidy made possible by the privatization via long-term franchised contracts. Initial estimates⁸ indicate substantial savings, although this is relative to recently escalated subsidy levels. Adding the administrative costs of servicing OPRAF and ORR (net of other earlier regulatory obligations) makes the savings smaller but they could still accumulate to sizeable amounts over time.⁸

European Approaches

In contrast to the British approach, what might be termed the European model concentrates on the separation of

infrastructure from operations, with emphasis on the development of free and non-discriminatory access for competition in service supply. While this model is widely accepted at the conceptual level, it is not yet fully operational. One remaining obstacle is fostering infrastructure access across national boundaries. Restrictions on free road movement across boundaries have been almost totally eliminated, but there is far to go for rail operations. This will be indispensable for promoting intermodality and rail-truck competition. In Sweden, Banverket, the rail infrastructure authority was established in 1988. A major rationale was to place road and rail transport on a comparable basis. Both operators now pay charges based on marginal costs. There is an annual charge per vehicle plus a charge per vehicle kilometer varying with vehicle type.

However, these do not cover full costs. Banverket also uses social cost-benefit analysis investment criteria like that used in the roads sector. As result, there has been a substantial increase in rail infrastructure investment. For the time being, Swedish State Railways (SJ) remains the monopoly operator on main routes, although secondary routes are put out to competitive tender. A greater degree of open access is under discussion, but there is no present intention to privatize either Banverket or SJ.⁹

The German experiment is complicated by the merger of two systems. In January 1994, the two state-owned German railways, Deutsche Bahn (DB of former West Germany) and Deutsche Reichsbahn (DR of former East Germany), were merged into Deutsche Bahn AG (DB AG). Traffic loss has been particularly severe on the former

DR system since reunification, and the government has taken over responsibility for much of the previous debt and the costs of surplus staff on both former systems.

Track and signalling have been separated from operations and DB AG has been divided into four parts: DB Reise & Touristik (long distance passenger and tourist traffic), DB Regio (regional passenger traffic), DB Cargo (freight) and DB Netz (infrastructure). Third parties will have open access to the infrastructure, and there are published access prices. These prices distinguish ten line categories, seven types of passenger train and five types of freight train. There are price differences for track wear-and-tear related to train weight, and for operator's requirements in terms of punctuality. There are also discounts related to volume and advance purchase, which have led to criticisms that the established operator will be at an advantage in relation to entrants. Another controversial feature has been the high level of charges because of a desire to recover total costs. High charges for track discourage frequent services, particularly regional and local services. Charges for such services have been subsequently revised. (However, in fact, it appears that charges were not recovering total costs even before this revision.³)

Australia and New Zealand Approaches

In contrast to the British and European approaches, New Zealand has gone for fully-fledged privatization of a vertically-integrated system without open access. New Zealand Railways (NZ) are predominantly freight, although there are some long-distance and commuter passenger services. The latter are provided in Auckland and Wellington under contract, but the long-distance passenger services are not supported by government. After initially being restructured as an 'arms-length' company, NZ was offered for sale



Curitiba busway system in Brazil

(Authors)

in 1992 and sold to a consortium that included Wisconsin Central Ltd. (USA), Berkshire Partners (USA), and Fay, Richwhite of New Zealand.¹⁰

The most innovative recent developments in Australia are those in New South Wales. The 1996 Transport Administration Act restructured the New South Wales State Rail Authority (SRA) into four corporate entities, each with two shareholders neither of whom is the portfolio minister. The four agencies are: Freight Rail Corporation of NSW operating as FreightCorp, a rail based freight transportation business; State Rail which provides commuter transport as CityRail (Sydney metropolitan) and CountryLink (non-metropolitan); the Rail Access Corporation (RAC) with responsibility to own, operate, maintain and enhance rail infrastructure and to actively market access to those facilities by existing and potential rail operators; and the Railway Services Authority, which is the railway engineering and maintenance group with a mandate to become fully commercial after 2 years.

Rail services are affected directly by a new competition policy in Australia. In 1995 each State Government agreed with the Federal Government to implement a national competition policy under the Council of Australian Governments (COAG) National Competition Policy Agreement. One aspect requires access to essential infrastructure facilities that are important to competition in other markets (intermediate inputs) and that would be difficult to replicate and are of national significance. New South Wales is developing its own rail access regime to comply with this.

Users of the infrastructure should not be at a disadvantage in relation to the infrastructure provider, in other words there should be competitive neutrality. This is seen to require a clear accounting separation for rail infrastructure, but not structural separation on the British and

Swedish lines.

The RAC is responsible for negotiating access to the infrastructure. This has required the SRA to improve its cost and revenue data allocation, as well as its negotiation and contract documentation. The National Rail Corporation, which has taken over loss-making inter-state freight traffic, requires access to SRA tracks and hence an access pricing regime, while SRA's own Rail Freight requires access to track and yards in the Sydney area. Other private companies have entered the interstate freight market.

A fixed-formula approach to access charges has been rejected in favour of a cost-based system with negotiation of access prices with users or potential users. This raises similar issues of cost allocation and asset valuation as in the UK. The individual states in Australia have different views on track access pricing. Views range from equal pricing to Ramsey Pricing and prices equal to the opportunity cost of the foregone marginal revenue.

An interesting issue is the charges for transporting Hunter Valley coal exports. This has been very profitable traffic for the SRA and past profits have been regarded as a kind of mineral exploitation royalty. Now, with open access, the mining companies want to handle the traffic themselves or to contract it out to third parties. However the potential loss of cross-subsidies is a serious political consideration.

Pricing rail access is also complicated by very different market segments. In the east-west corridor, rail has a market share approaching 80% and this is the only corridor that recovers fully distributed costs. The eastern rail corridors attract only 20%–30% of the general freight market. In long-distance passenger transport, the rail share is less than 6%; in urban public transport, it is around 30%. There are worries that in a country such as Australia with long low-density transport corridors, a combination of open

access and privatization could lead to monopoly services combined with inadequate investment and a heavy subsidy burden on the states for loss-making operations. In other words, many people question how effectively competition can work in such a system.

Conclusion

The world's rail industries today are a paradox. The importance of railways in the total transportation market is a fraction of their importance decades ago. Many people still think of railways as bastions of outmoded, government-controlled, unionized industries. But the reality is different and changing rapidly. Railways have undergone substantial productivity improvements and radical technological change in some markets such as high-speed rail (although the latter remains dependent on substantial government support). Railways are undergoing nothing less than revolutionary change in management orientation, industrial organization and government policy. Many of these changes are just underway. As with any risky venture, there will be failures but the successes will guide rail reorganization and performance improvements for the coming decades. Despite the difficulties, we believe that the resurgence of railways is with us, especially in niche markets. Notably, the future of high-speed rail is healthy, with successful systems in Europe and Japan and new systems likely to be in place in Asia and Australia over the next 20 years. Light-rail systems are also popular but an enigma to many, supported primarily on a mix of ideology and government subsidy. It is rare to find a commercially viable light-rail system. The alternative of bus-based transitways as seen in Curitiba (Brazil), Ottawa, Pittsburgh, and recently in Sydney, offer a more cost effective solution to light rail.³ ■



Proposed Sydney–Canberra high-speed railway using TGV technology

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Notes

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