

RAIL INFRASTRUCTURE MODELS OF OWNERSHIP AND ACCESS REGIMES: SOME AUSTRALIAN DEVELOPMENTS.

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Abstract: Railway ownership models have emerged in recent years which represent variations on two themes - the form of ownership and degree of operational integration. In Australia, the situation is further complicated by the imposition of open access regimes on government-owned enterprises of national significance. These developments are examined in detail. The paper briefly places current debate on ownership models in an historical context and draws on current developments in Europe and North America. It is concluded that there needs to be a very careful reappraisal of the direction of Australian railway policy. Australia suffers the problem of long thin transport corridors and heavy sunk costs in each transport mode. Open access may mean a private monopoly of choice routes with the remainder vanishing or remaining as a direct burden on government budgets. In Australia, competition in transport may be simply inefficient in the long run.

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INTRODUCTION

The most remarkable thing about the discussion on present reforms in railway ownership and models of management is that it is (unknowingly) reviving debates which occurred almost a century ago regarding the ownership of the railways. The economics of railway operations were understood by operators and, to a lesser degree, legislators a century ago when the issues of rates, ownership and working practices were hotly debated (see Dunn 1918, pp.12-13).

The lessons of railway history are two fold. First, while the nature of ownership may vary between countries, the basic economic fundamentals remain the same. Second, the results of competitive forces must be examined over the long run, not the short run, because the long run outcomes are often contrary to the intended outcomes of railway policy.

The paper briefly discusses 19th century railways. It then examines developments in Australia since 1990 against the backdrop of international trends and the issues which arise from such developments. The paper concludes with a reflection of what may lie ahead in Australia if current policies continue.

SOME NATIONAL RAILWAY POLICIES OF THE 19TH CENTURY

Railway economists at the turn of the century understood: that sunk costs dominate the pricing of railway services; the case for vertical integration of light and heavy rail services; the essential indivisibility of railway organisations; the problems of comparison of maintenance cost/mile between different railway systems; that as scale increases maintenance costs/traffic unit decrease; jointness of maintenance costs, in terms of classes of traffic, necessitating recovery based on "what the traffic will bear"; the need for deliberate cross subsidisation of certain classes of traffic (Acworth 1924, pp. 14, 20, 28, 31, 35, 39, 60).

National railway policy of the 19th century, in Western countries, suggests that such policy is an outgrowth of conditions in each country rather than a global philosophy of the time.

In Britain, the government did little to stimulate the construction of railways, but imposed few requirements or restrictions on their charges or operation. Dunn 1918, p.18 observed:

"This was the laissez-faire era in England. Government and people thought that all that was needed to cause the railways to furnish good service at reasonable rates was to maintain competition. It was soon learned that competition could not be solely relied on; because it could not be completely maintained; and different bodies were from time to time given limited supervisory authority." (italics added)

It was not until 1844 that the Parliament attempted to assume the power to acquire railways for a sum equal to 25 years purchase on the average divisible profits of the three years proceeding purchase under 7 & 8 Vict. C 85. However, Gladstone's Bill failed to gain parliamentary support, leaving the private railways to carry on the process of consolidation while the State sought indirect control over their anticipated monopoly (see Cleveland-Stevens 1915, pp. 107-124).

The French Government was more interventionist than their British counterparts. The Parliament of France between 1825 and 1837 debated whether railways ought to be built by private companies or the State (see Dunn 1918, p.19; Meyer 1906, pp. 123-132; and Pratt (unk.) pp. 17-19). After 1833, the railway concessions always had the provision for compulsory acquisition of the railways (Dunn 1918, pp.19-20). After the expiry of the concessions (usually 40 years) the railways reverted to the State, on payment for the rolling stock. In fact:

"The French economists and statesmen considered railway transportation naturally monopolistic; and the government acted accordingly. Each line was laid out to serve a distinct territory." (Dunn 1918, p.20)

Further:

"To secure the needed construction, the government in 1850 adopted a system of guaranteed of interest. These conventions gave the large roads solid credit, and by 1870 the mileage of the country had practically doubled." (Dunn 1918, p.21)

In short, the French Government maintained close supervision of railway construction, operation, rate-making and finances (Dunn 1918, p.24; and Meyer 1906, pp. 123-132).

In Germany, early railway construction was by private enterprise, yet the financial involvement of the German states was needed to guarantee the interest of the railways. After the depression of 1845-48 Prussia took over some small "embarrassed" private railways, but like other German states, their policy of ownership was not consistent. The Franco-Prussian war and the federation of Germany caused Bismark to want "a unified [railway] system as a means of binding the empire together politically and strengthening its military position" (Dunn 1918, p.25). Until 1910, the process of acquisition proceeded gradually (Dunn 1918, p.26). By then the State-ownership of the railways then assumed great significance as railway rates became a major source of tax collection and a means of positive local discrimination. The rigidity of these rates lead eventually to the construction of canals in parallel to railways to successfully undercut the them (see Meyer 1906, pp. 52, 71).

United States' legislation did not contemplate public acquisition of railways because private ownership was considered the natural policy. In fact, the railways perpetual franchises (Dunn 1918, pp.49-50). The government subsidies that were given were as outright donations and the "land grants made became absolute when the mileage on whose construction they were contingent had been built" (Dunn 1918, p.47). Direct financial relationships between government and business were purely temporary. Even when railways became financially embarrassed, they passed into private, not public, receivership because their creditors were private capitalists not the government, unlike in Europe (Dunn 1918, pp.51-52).

Britain's colonies in Australia built railways as instruments of political advantage (Dunn 1918, p.119, fn. 1), after private enterprise failed to construct and operate heavy railways successfully on a major scale (see Lee 1988, p. 11-24, Williams 1989, p.358; Williams 1995, pp.121-122). Private capital was scarce and early promoters of private railways proved fraudulent and/or insolvent. The colonial governments developed public railways with radial networks centred on the seat of governance (except for Queensland). The networks captured the interior trade which was reinforced by the (unintentional) adoption of unequal gauges between adjoining states. Attempts at private light urban railways were more successful due to the smaller sunk costs, traffic densities and cross-

subsidisation via provision of domestic electricity services (see Brimson 1983).

These events demonstrate that railway policy differed between countries at the same time and over time, in response to national needs. Yet the problems of development, operation and finances were very similar in each country - huge sunk costs, uncertain traffic, a tendency to natural monopoly and government support in-kind or by financial guarantee.

DEVELOPMENTS IN AUSTRALIA: AFTER 1990

Network: Scale, Condition and Performance

Overall, rail transport in Australia represents about 1 percent of GDP, with freight revenues of just under \$A3 billion annually. Although Australian rail systems have achieved considerable productivity gains in the last decade, unit operating costs are still well below world's best practice (Bureau of Industry Economics 1993). The level of demand on the existing interstate network, translate into annual freight flows which are below 3 million tonnes for two-way flows on all inter-capital city corridors. The Eastern seaboard rail corridors from Adelaide to Brisbane attract between 20 and 30 percent of general freight market. In the East-West corridor to Perth, rail has a market share approaching 80 percent.

In terms of cost recovery, all interstate corridors with the exception of the East-West route, fail to recover fully distributed costs. Although detailed cost information is not publicly available, the nature of the operations on the eastern seaboard (market share, freight rates and infrastructure constraints), means that the train operating costs on this entire corridor are unlikely to be covered by revenues.

There is a considerable investment shortfall in rail infrastructure for the strategically important national links. The BTCE (1995) has estimated that those links require annual investment of the order of \$A150 million over the 20 year period to 2015 (in 1995 dollars) in order to improve the level of service provided by operators. There are several major issues related to current infrastructure condition in Australia, namely:

- (1) *track alignments* (vertical and horizontal) particularly on the Melbourne - Sydney - Brisbane corridor, which make rail transit times uncompetitive with road and place constraints on wagon productivity increases in the form of double-stacking of containers, in fact Laird and Adorni-Bracessi (1993) have identified that around 35% of the above corridor fails to meet US Class I railroad standards;
- (2) *track condition* constraints (speed restrictions and maintenance costs) on all corridors except the East-West route from Melbourne to Perth which is mainly due to low historical maintenance budgets and lack of past capital investment in the past;
- (3) *train control and communications* systems are currently being replaced and modernised but a very slow implementation rate, thus the new technology will require capital investment which cash-strapped State and National rail systems have been unable to provide.

Passenger Services and Organisation

Rail has a highly urbanised role in passenger transport in most Australian states. Intrastate and long distance interstate passenger railway services have been severely pruned in most states as part of a rationalisation process. Buses have replaced trains in intrastate passenger services (e.g Country Link in NSW). In NSW, Country Link supplied 2.2 million passenger trips in 1994-95 compared with 250 million for the suburban services in Sydney (ARA 1996). Only Queensland has held the line on sustaining a state network of rail passenger services.

Rail accounted for one third of all public urban transport journeys in 1995 (compiled from BTCE 1996, p. 17 and ARA 1996, various pages) and of the urban public passenger kilometres travelled in Australia, rail carried 19 percent. For non-urban public passenger services, rail carried 4.7 percent (Allan Consulting Group 1993, p.14, Fig.2.3).

In Victoria, Melbourne's metropolitan passenger railway operator is government owned. In Melbourne, it is likely that two franchises will be awarded for the heavy passenger rail; and two franchises for the light passenger rail. This will effectively create a tight oligopoly on a city basis in rail services. Whether the sell-off will be based on geographic monopoly is not yet clear. Beyond Melbourne several passenger rail franchises have been awarded to private operators. In 1993, West Coast Railway Company gained the franchise provide to service on the Melbourne-Geelong-Warnambool route (267 kilometres). In 1996, the Melbourne-Sheparton route was franchised. Both franchisees have come from the bus industry and both have leased most their resources including train crews from the government-owned Victorian Rail system.

In NSW, the state's railway organisation has been divided into smaller business units based on geography/function. The suburban network is now operated by CityRail. Country rail services are now operated by Country Link. Vertical separation has occurred in the form of a separate organisation - Rail Access, who manages the total infrastructure assets of the state railways. There has been private sector involvement in the provision of rail infrastructure in NSW as in the case of the southern railway link to Sydney airport, which is currently under construction.

In Queensland, Queensland Rail remains fully integrated, although there are business units for particular markets. Brisbane's suburban network is a fully government-owned monopoly. However, a contract to built and operate (for a 35 year period) a passenger rail link to Brisbane Airport has been awarded to the private sector.

In Western Australia, Transperth runs the suburban rail network of Perth, while Westrail operates all other services - both are government owned enterprises.

At the national level there have been expressions of interest in the operation of long distance tourist trains such as the Indian Pacific from Sydney to Perth.

Freight Services and Organisation

The national rail freight market dwarfs the national passenger market. The national rail freight market is dominated by the interstate rail services. Road transport operators (with the exception of the East-West corridor) compete directly with rail in all markets. Yet in some routes it is a client,

due to the leasing of trains and terminal space. Currently, the National Rail Corporation is the only rail freight carrier operating at the national network level. Two private rail operators have recently entered the market on specific routes (Melbourne - Perth). Both new entrants are also road transport operators. It is likely that, under the 'open access' regime, the few profitable routes will see competition, in the initial stages. However, in the absence of very significant investment in the remainder of the network, parts or all of it may cease to exist - if commercial conditions apply.

INTERNATIONAL TRENDS IN RAILWAY OWNERSHIP MODELS

Two main ownership and control models are emerging in practice, namely: the vertically integrated railway with or without separate internal business units; and the vertically separated railway with track infrastructure managed and owned separately from multiple operators. The separation model has been adopted or proposed in some countries, notably in Great Britain, Germany, the Netherlands and Sweden (Nash and Preston 1994; Jansson and Cardebring 1989). The European Union has a policy of moving towards the separation model (Nash & Preston 1994). A similar approach is being adopted for interstate rail services in Australia, following the competition-related proposals adopted by Federal and State governments (inspired by Hilmer et al. 1993).

It is argued that one of the drawbacks of the vertically integrated model, is its inability to readily and fairly accommodate new entrants in the form of operating competitors, sharing a common track infrastructure. The question of fairness in dealing with potential competitors would require strict contractual arrangements related to costs and service quality. The terms and operating conditions of track access need to extend to train dispatching rules. This is particularly important under single line operations, where the train conflict resolution rules need to be seen to be free of bias towards specific operators, as well as operationally efficient. Certainly privately owned US railways have encountered the bottleneck carrier problem - in the 1980s at least (see Tye 1987a, 1987b).

The vertically separated model has been put forward as a way of increasing competition in the rail sector. In Great Britain, as competition has not yet materialised in practice, the benefits of separation may turn out to be small relative to the costs of loss of co-ordination and transaction costs, such as contract specification and enforcement (Dodgson 1995). In the case of Sweden, the new vertical separation and 'open access' environment has not lead to increased competition due to the considerable barriers to entry and the low traffic densities present.

The vertical separation model has implications for overall productivity of rail operations, given the nature of the railway business, with its close inter-dependence of investments. In addition, the bargaining power of new entrants to negotiate contracts with a monopoly track owner acting to achieve commercial objectives, needs to be adequately safeguarded. If the track authority levies full cost recovery based on long term marginal costs, for purposes of access prices, the danger is that there will be no requests for access because other, cheaper and subsidised forms of infrastructure are available - highways.

ISSUES ARISING FROM RAILWAY RESTRUCTURING

Vertical v. Horizontal Separation Models: Coordination and Competition Issues

Railway track investment decisions are strongly related with investment decisions about other types of rail infrastructure. Decisions about track capacity may have an impact on operating strategies and thus on the level of service provided. Thus track investment decisions must be part of an overall long-term strategic plan designed to achieve an organisation's goals and staged over time to maximise their benefit. Under the vertically separated model, such decisions need to be taken in a spirit of co-operation between the main operators and the infrastructure supplier. Ferreira (1997) provides a detailed discussion of the interdependence issues in rail operations.

Track Access Pricing Principles

Access pricing for the entire Australian interstate network will enable price discrimination based on train and corridor profitability, as well as on track maintenance costs. But "transparency requirements" (such as in Australia's National Competition Policy Agreement) will supposedly deny this action. These requirements are intended to take into account the 'fair' and 'equitable' criterion, so that no operator is disadvantaged with respect to opportunity to access track at a commercial rate. Furthermore, to achieve the objective of access pricing, whatever it is, will require a common pricing philosophy at a national level.

It is well-known that transit times and reliability of arrivals have an important part to play in gaining market share for rail. What is less well known, to some economists at least, is that both these service attributes are strongly associated with track infrastructure design and maintenance standards. Therefore, the ability of an operator to perform efficiently, and to gain market share, is closely tied to his ability to strike an effective contractual arrangement with the track controlling agency.

When the track authority monopolist is faced by an oligopoly of buyers of track access, the former faces potentially different demands for track maintenance, track design and capital needs from different operators and/or different services. In particular, different market segments such as intermodal freight, commodity based unit trains, and passenger services, have different profitability and operational characteristics (such as maximum speed and axle-load standards) which have investment and ultimately user charges implications.

The track access provider may be obligated to ensure a 'level playing field' so that each operator can gain access to track at the appropriate time and cost. Yet this may be contrary to sound commercial practice for a corporatised agency. For instance, the value of monopoly access to one private operator may exceed the sum of the potential rents paid for access by the oligopoly! Conflicts of access to track are likely to occur between users who may be competing against each other in the market place. The track provider will need to be seen to adhere strictly to the fair practice provisions of current legislation, but justice need not be efficient in an allocative or productive sense.

Access Pricing Strategies

Commonly, public utility pricing - where joint-common costs arise - is dealt with via resource-based or demand-based pricing.

If a resource-based approach is taken, engineering data must be collected. Then, with the model of vertical separation of track, each user must be charged track maintenance and capital costs on the basis of damage caused and track standards required. When several operators compete for the use of track owned by a separate entity, it is essential to know the damage being caused by each user, both in the short-term and long-term. Rail traffics need to pay at least the avoidable costs they incur. The joint costs (those which cannot be attributed to specific users), tend to be a significant component of total track cost (UK Department of Transport 1993). The allocation of track costs amongst users is a major issue given that there is still a poor understanding of track deterioration causes (Ferreira and Murray 1997). The effect of train speeds, axle-loads and vehicle types on maintenance effort is currently estimated without a great deal of precision. However, the charges should reflect such factors as far as possible.

Taking the demand-based approach (see Kolsen 1968 and Brazil et al. 1993), demand elasticities are used as the means to devise a set of charges which are inversely proportion to the own-price elasticity coefficients of users. For strictly joint costs, prices are set in proportion to the inverse ratio of the own-price elasticities - marginal costs per user being indeterminant. For common costs, prices are set in proportion to marginal costs (as measured by the marginal revenue foregone by a monopolist from the sacrifice of a particular service). To ensure that capital costs are recovered from each user (group), where marginal costs can be separated out for each user (group), an extra charge is applied which is a proportional share of the capital costs inversely related the elasticity ratios. The problem is the data about demand elasticities or rather the lack of it. Still, commercial operators have dealt with the problem on the basis of "what the traffic will" bear for 200 years - no transparency requirements for them!

The question of limiting track capacity at peak times will involve a user charging system which can take into account both the availability of train paths and the risk of delays at such times. In the context of Australian inter-capital city freight movements, train departures tend to be concentrated within a narrow time period during late afternoons/early evenings. Such desirable train paths may require an auction pricing system as a rationing mechanism. Alternatively, peak charges need to reflect scarce capacity, as well as the potential for train delays to cause delays to all other trains in the system at the same congested times. A model has been developed by Higgins et al. (1995) to estimate the likely risk of delays to trains under single line operations.

Although the Australian interstate network may suffer from congested periods, it has considerable spare capacity outside such peak periods. The total number of inter-capital city freight train services is small enough to allow for a two tiered pricing system to reflect available capacity. Track access charges should reflect such over-supply periods by offering sufficient incentives to operators who are willing to buy off-peak paths, subject to the track damage costs incurred being fully recovered.

While not forgetting the systemic detail of the Australian railways , an important point about common services must be rembered. To set access price equal to the marginal revenue foregone - namely the value of the displaced traffic - rather than the marginal resource costs, does not guarantee financial viability. The new traffic may not be not prepared to pay rates that collectively cover

capital and operating costs (Kolsen 1997). This is likely to be the attitude of new entrants because they are already supplying competing services by road.

FUTURE DEVELOPMENTS

If present trends continue in Australian railways, then three major issues will soon emerge, namely: network vs corridor ownership/control; cross-modal pricing and ownership rules; and barriers to entry/ monopoly.

Network v. Corridor Ownership/Control

Although an interstate rail track authority will shortly come into being, its equity owners are uncertain. It will be government owned but whether it will involve the States or merely the Commonwealth is also uncertain.

Interstate rail freight operations will be in the hands of the current National Rail Corporation and private operators (currently TNT and SPC). The Government has indicated its desire to sell the NRC, and there is expressed interest in its purchase by TNT and other firms not currently operating in the market. There will undoubtedly be a cherry-picking process given the distribution of freight by routes. The better routes are not just about freight distribution, but also about the condition of the track and the degree of competition from road and sea transport. Routes such as Sydney-Melbourne and Sydney-Brisbane will require substantial investment to upgrade the railway track before they can be serious competition for road in particular. Who is prepared to make such an investment of public resources before they are sold off at (probably at a discount) to the private sector? Existing freight forwarders on these routes already have a good deal of route specific knowledge and they have 70 to 80 percent of the current market. They already lease trains from the public railways of each of the States servicing the routes. TNT has for more than a decade leased rolling stock and entire trains are loaded and unloaded at its own terminals adjoining public railway termini. Given the state of incumbency, there may not be increased competition but in fact decreased competition, if one of the incumbents successfully purchases the main public operator in each state.

Cross-modal Pricing and Ownership Rules

The new track authorities will have to fix charges for access. What will be the basic philosophy? Will each authority maintain common and consistent charges? In the case of NSW, the State Government (a Labor Party Government) has already indicated that it will consider its entire track network a CSO! The Government of Victoria in the typical fashion of interstate rivalry will be different to NSW in its track charging philosophy. The Kennet (Liberal-National Party) Government seems to be adopting "a charge what the market will bear" approach. If the intention is to advantage the host state over the adjoining state, then the access pricing regime may violate section 92 of the Australian Constitution. Along the NSW and Victorian border and along the Victorian and South Australian borders there are major agricultural areas that could switch the port of export from one state to another, if the access pricing regimes yield substantially different rail freight charges between competing ports in each state. For example, Portland in Victoria could capture some South Australian freight which currently proceeds abroad via Adelaide.

The Australian Competition and Consumer Commission will soon find itself embroiled in a argument between private carriers and their clients over whether charges levied breach the *Trade Practice Act 1974* on price discrimination grounds.

National Rail Corporation and the Track Access (NSW state railway company) have already resorted to an arbitrator with respect to contract matters about access prices and track performance. With respect to the latter, NRC and TA were unable to agree on a relationship between price of service and level of service.

Barriers to Entry/Monopoly

NRC has been the only network carrier who has had to buy access from each state's railway to move freight along the landlord's track. Now we will have the same number of landlords, but potentially more tenants.

Terminals will be critical to market entry. Congestion will be a problem. Like airports, demand is highly indivisible in time terms. The power of price to divert traffic to off-peak times is limited due to the demands of the freight forwarders. Unless you are a big player and can build your own terminal, then you must pay the rates levied by private terminals. There will be no public terminal. If you want to run your own train, then you'll have to make do with the facilities which your competitor, who owns the terminal, is prepared to supply. National competition policy may determine that there will be access to all comers, but it is mute about how it will be guaranteed!

Unlike the airport case, where airports are owned by one company (either public or private) and airlines by other companies (public or private), what is proposed in Australia is for the railway track and traffic control to be held by the landlord, who will be a state government or the Commonwealth Government. The operation of the trains and the terminals will be in the hands of any private firm with the "capital" to compete in this market. A likely development is that, to stifle competition between rail and road, an existing road freight company will become a train operator. Of all freight handled in Australia, private mineral railways excluded, government rail handles 22 percent of the national load, of which 14 percent is movement of bulk materials (measured in (net) tonne kilometres) (Allan Consulting Group 1993 p. 14, Fig.2.2). This is the potential prize.

Outside the urban areas, the impact of access process proposals will fall far more heavily on the freight trade than the passenger trade of the railways.

CONCLUSIONS

The overseas trend towards the formation of rail infrastructure entities as separate businesses supplying services to operators is also being followed in Australia. Recent Federal/State Government agreements to increase competition within the transport sector have provided added impetus for the vertically separation of railway businesses. However it is important not to underestimate the difficulty of making the vertically separated railway work effectively in practice. The issue has significant implications for investment and resource allocation for the land transport sector, as well as long-term rail profitability and performance.

It is concluded that access pricing needs to be formulated in the context of an overall set of objectives; national transport planning goals; and the implications for the road and rail freight industry in particular. There is a need to move away from homogenous pricing of services, so that full account is taken of the physical characteristics of both track and trains; the profitability of each train; and track capacity effects. The latter will require that peak and off-peak charges be implemented to discourage the current bunching of train departures from most capital cities.

There needs to be a very careful reappraisal of the direction of Australian railway policy. History demonstrates competition in rail transport is usually short-lived, as in any oligopoly with a weakly differentiated service, followed by a long period of rationalisation and concentration of ownership. Australia suffers the problem of long thin transport corridors and heavy sunk costs in each transport mode. Open access may mean a private monopoly of choice routes with the remainder vanishing or remaining as a direct burden on government budgets. Competition in transport may be simply inefficient in the long run in Australia.

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