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SEPARATING TRACK FROM OPERATIONS: A LOOK AT INTERNATIONAL EXPERIENCES

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Background

Recent years have witnessed a significant shifts in transport policy (Button and Keeler 1993). There has been, as part of what has been called a 'general withdrawal of the state', an almost universal move towards market liberalisation and the transference of significant parts of transport supply from the public to the private sector. Of particular interest has been the contemplation, and sometimes, implementation of the standard model in road transport for use in the rail sector – namely a separation of track and fixed infrastructure from operations. This would reverse the existing structure whereby, in most countries, these functions have been vertically integrated. In some European countries, in particular, this interest in severing the link between infrastructure and operations has often been connected with privatisation since much of the rail network has been, at least in recent times, in public ownership.

The aim of this paper is to explore some of the key issues which underlie this upsurge in interest in treating modes such as rail in much the same way as road transport has always been handled. In particular, it seeks to explore the ways in which operations may be distanced from infrastructure administration and the types of policies which have been adopted, or are in the process of being adopted, around the world in efforts to do this efficiently. Surprisingly, in relation to the amount of recent analytical work done on other aspects of transport policy, the issue of separating operations from track is comparatively under researched[1]. This should not, though, be taken to mean that the idea is the result of some sudden inspiration; indeed seminal papers on the subject appeared in the UK over half a century ago (such as Mance 1940) and the issue has been raised in previous transport policy debates in countries such as Canada[2].

At the outset it is important to delineate the scope of the paper and to draw some boundaries. The concern here is with the explicit separation of operations from track and other fixed infrastructure (such as signalling) but it does exclude some forms of such separation. In particular, there are many countries with multiple domestic rail road suppliers which have long standing agreements allowing one operator to buy a path through another's track network. In others, such as with Canada's duopoly structure, there is a history of joint ownership of terminals as well as track arrangements. Similar agreements exist at the international level to allow operators to provide cross-border services. Indeed, in this latter context the European Union now requires national governments to allow open access to their rail networks and to produce separate track accounts to prevent unfair pricing (Commission of the European Communities 1991). Finally, there are also a number of special arrangements at many tourist locations whereby special trains hire space on track owned by a vertically integrated rail road – the Orient Express between London and Venice being an example. We are, however, much less concerned with these types of arrangement than with the direct removal of operational activities from the ownership of track.

The paper initially proceeds by looking at the economic justifications for the vertical separation of the responsibilities of the fixed infrastructure and the operations of

railways. There is also an examination of the privatisation issues which are accompany the separation debates and policy changes. The paths of disintegration being pursued by countries around the world are categorised and explained. Finally there is a discussion of some of the problems which are involved in a separation strategy together with some observations on the types of regulation which may be required to tackle them.

Economic Justifications for Separation

Initially, it seems reasonable to consider why the matter of removing vertical integration in rail transport has suddenly interested so many governments around the world. While there are naturally a number of local reasons for this interest, not least the problems encountered by some governments in financing their currently integrated systems, some key common features seem to emerge.

Efficiency has been widely held to be a prime motivation underlying recent market liberalisation and privatisations in all spheres of transport supply and this extends to arguments for separating rail operations from track. In fact, though, there are at least two independent issues here.

First, there has been a gradual increase in concern with what can loosely be described as supply side economics and with the costs of providing transport services. This has entailed a shifting of emphasis from normative, distributional considerations to matters of positive economic efficiency. What this has meant in transport policy terms is that, for a variety of reasons[3], the so-called 'Anglo-Saxon' approach to transport policy has gained ground against the 'European' philosophy. Whereas the former is primarily directed at providing the transport services customers demand at the lowest possible cost, the European philosophy sees internal transport efficiency as secondary to the achievement of wider, often distributional, objectives – as, for example, typified by the French notion of *droit de transport*. and the concept of *gemeinwirtschaftliche Aufgabe* of the German railways[4].

Linked with this general change in emphasis, and more directly to our interest in vertical separation in rail supply, is a shift in the attention policy makers have given to various forms of efficiency itself. This is a change which, as with most sea changes in public policy, also transcends the narrow confines of the transport industries. The interpretation of the term 'efficiency' has, of course, many dimensions and, in the context of public policy, the economist's traditional taxonomy has proved to be important in the revision of objectives (see Table 1).

Table 1. The nature of economic efficiency

allocative efficiency	– requiring first or second best pricing of the final products
scale efficiency	– requiring possible limitation on sub-optimal entry to the industry
technical(X) efficiency	– requiring cost minimisation by the incumbent firms
product choice and dynamic efficiency	– requiring innovation by incumbents

One strongly defensible interpretation of European and Canadian privatisations, for instance, is that they represent a change in emphasis from the first two categories of efficiency described in Table 1 to the second two. The traditional arguments in favour of the large size of the public sector in many Western European and other economies rested on the assumption that nationalisation and public enterprise organisation were essential to avoid consumer exploitation by natural monopoly utilities and also to ensure that, so-called, strategic industries behaved in the national interest. The industries themselves were usually urged to adopt second best pricing policies, such as Ramsey pricing, in order to simulate optimal resource allocation even though the industries, through their information monopolies, could retain the final say over the level and structure of marginal costs. To ensure scale economies could be reaped, entry was generally discouraged by other than approved suppliers which in practice often meant state owned monopolies.

The change in attitude has come about ,in part, due to mounting concern about the levels of subsidy which have often either explicitly or, in the case of cross subsidies, implicitly arisen as a result of this policy and with the accompanying questions regarding of the value for money achieved[5]. In a more dynamic framework, there has also concern that many of these rail industries have been losing market share to newer technologies and have themselves been slow to innovate either in the technology deployed or the management structures adopted.

There has been a further element to this trend, and one of more particular relevance to the railway industry. Many of those that had initially supported public ownership of rail or, as in the US and Canadian case, strict regulation of vertically integrated rail supply provision had done so on arguments concerning the intrinsic nature of the costs incurred by the industry. It was traditionally assumed that, because of high fixed costs in railway supply, there are economies of scale in railroad operations and that, as a result, some form of controlled large scale supplying agent (or agents) was thus optimal (an idea which goes back at least as far as Lardner 1850 in the academic literature). This line of argument supporting the natural monopoly hypothesis was further supported by arguments about the multi-product nature of railways which provide a variety of origin and destinations service, offered at different times, often for both passenger and freight customers, and the consequent need for horizontal integration which stems from this. This can be seen as essentially an extension of the Coasian (Coase 1934) argument of internal transactions cost minimisation.

The more recent econometric evidence brought about through improved modelling and estimation procedures[6], though, indicates that in the US (see Table 2 for a summary of some of this evidence) and in many European countries[7] that there are limited scale economies overall except for very small rail roads,. What does exist, however, are very significant economies of density[8]. In short, what this effectively means is that the economies of scale that are to be found are associated with the rail infrastructure (track and signalling) and not the operations making use of this infrastructure. Further, some of these studies (for example, Friedlaender *et al* 1993) have found that these operational economies are increased when the capital stock is optimised. In such circumstances, the logic suggests that to obtain high levels of dynamic and X-efficiency there should be competition for the provision of these services, since there is little tendency toward natural monopoly in providing rail services. The economies of scale argument (at least up to a certain network size) still seems to applies to the track, however, and the associated problems of natural monopoly, therefore, remain in infrastructure provision. The argument, however, for vertical integration of operations and track is broken.

Table 2. Economies of scale in US freight transport (1= constant returns)

		Returns to Scale	
	Data base	*Fixed haul and trip length*	*Increased haul and trip length*
Friedlaender and Spady (1981)	1968–70	0.88–1.08	1.07–1.37
Caves *et al* (1981)	1963	1.01	1.13
Harmatuck (1979)	1979	1.01	1.02
Harris (1977)	1977	0.93	1.02
Keeler (1974)	1974	1.01	–
Caves *et al* (1985)	1951–75	0.98	1.00
Friedlaender *et al* (1993)	1974–86	1.27*	1.21**

* Short run; **Long run

Finally, there is increasing evidence that centralised control of publicly owned railways leads to higher levels of internal cost inefficiency. Table 3 provides some evidence on this with regard to nineteen European railway companies. Taking an index of overall autonomy and comparing it with a measure of overall efficiency, Gathon and

Pestieau (1993) find a high positive correlation to exist. While this, in itself, does not provide a case for vertical separation, it does suggest that the efficiency of any aspect or segment of rail activity is likely to improve if it is freed from high degrees of regulatory intervention. Vertical separation provides more scope for achieving this.

Table 3. Efficiency of European railways 1986–1988

Railway	*Country*	*Autonomy (%)*	*Gross Efficiency*
BLS	Switzerland	100.0	0.873
SJ	Sweden	80.0	0.835
BR	UK	76.3	0.877
NS	Netherlands	70.3	0.897
SNCF	France	69.8	0.875
FS	Italy	67.0	0.830
CFF	Switzerland	66.0	0.883
SNCB	Belgium	64.5	0.813
CP	Portugal	64.0	0.856
CFL	Luxembourg	63.5	0.731
DB	Germany	61.0	0.802
TCDD	Turkey	60.0	0.888
CIE	Ireland	58.3	0.862
RENFE	Spain	52.3	0.822
CH	Greece	47.3	0.743
NSB	Norway	45.3	0.702
OBB	Austria	41.8	0.785
DSB	Denmark	41.5	0.693
VR	Finland	40.0	0.828

Source: Gathon and Pestieau (1993)

Role of Privatisation

Of course not all of the recent interest in vertical separation of rail functions has also involved debates over privatisation but many have embraced at least a degree of interest in privatisation. In practice, the term privatisation is, however, freely used but seldom is specific in meaning (Gomez-Ibanez and Meyer 1993). It is sometimes taken to mean the direct transfer of assets from the public to the private sector (as with Air Canada)[9]. Others have preferred somewhat broader definitions which include deregulatory measures opening up former public sector monopolies to private sector competition (as with European aviation markets since 1993). Further, as with the UK bus sectors, such deregulation is very often followed by the transference of ownership from the public sector supplier to private ownership. In other cases, as with many European urban transit systems (Button and Rietveld 1993) the franchising out of services to the private sector is brought within the remit of privatisation. Equally, there are franchising arrangements which involve private companies tendering for transport services formerly directly provided by local or central government. The franchising system can also extend beyond simply providing operating services to the construction of major pieces of infrastructure under, what the French term, 'concessionaire' arrangements. Publicly defined infrastructure is built and operated by a private company but reverts to public ownership under pre-agreed terms (for example after a set time period, as with the Channel Tunnel). Privatisation is sometimes seen as involving the retention of public ownership but with private capital financing – ventures such as the French TGV high-speed rail network have been so funded. Alternatively as with German and Japanese railways it has meant the creation of public companies albeit with 100% government share holding in the short term.

The nature and division of public and private sector participation is important in many of the debates which have surrounded the discussions over rail track/operations separation. Much of the interest relates back to the basic objectives of policy. If they are

primarily to do with dynamic and technical efficiency then the degree and nature of both regulation and public ownership are clearly important. Available evidence suggests that unit financial costs tend, in virtually all conditions, to be lower with more liberal regulatory regimes and less public sector participation. The detailed nature of the regimes do, however, also seem to bring about variability in these costs. The issue when efficiency is the key criteria is thus one of the form privatisation should take and the ways in which transference from the public to the private sector is most smoothly achieved. As can be seen from the earlier discussion, there are many options available for policy makers to consider.

In contrast to this, in countries such as France, where the priorities are still more to do with raising funds for new investment, ownership considerations are only relevant as far as they influence the flow of capital to finance new constructions. If private capital markets offer a greater and smoother flow, and at lower shadow price, then these tend to be tapped by public sector rail companies. Equally, this means that with much less interest in economic efficiency, concerns over the desirability to separate operations from infrastructure are less intense.

Methods of Separation

There have been a surprisingly large number of alternative options examined around the world regarding the form of vertical disintegration of the railways might take. Further, a number of different systems have already been put in place or are about to be implemented. While much of the theoretical literature focuses on the idea of the monopoly supply of track (often by a public agency) with competition for access to that track, and this has been the favoured approach in, for example, the UK, in practice there have been significant deviations from this. Our concern here is in placing the schemes which are currently operational, or at a stage of near implementation, into context rather than looking at those which are still theoretical 'will o' the wisps'. What is emerging is a taxonomy of alternatives which can, at this stage, be classified the following way;

Public operations/private track

We can take the USA as the main example of public operations on privately owned track. Amtrak was created in 1971 as a mixed public/private passenger concern[10] which contractually hires track from the private freight railroad companies[11]. Indeed, one of the primary aims of creating Amtrak was to remove the financial burden of providing unprofitable passenger services from a predominantly freight railroad system. Another was to meet the public obligation of providing that passenger rail service as part of a 'balanced transportation system'. The contractual arrangements between Amtrak and the railroads providing track infrastructure have varied with time but initially involved payments by the latter based upon the 1969 passenger deficit with the them giving equipment as part of their payment. Some government finance was also given to Amtrak.

The system, though, provided no real mechanisms for subsequent rationalisation or for reinvestment in run-down capital. Operations by Amtrak were often initially hindered by some freight railroads which gave their freight trains priority over passenger services. The resultant financial problems confronting Amtrak have not entirely been resolved despite the fact that the 1976 Railroad Revitalisation and Regulatory Act transferred the Northeast Corridor Boston-Washington line and some branch lines to Amtrak, removing the need to negotiate with fright railroads over access to these links. In addition frequent injections of public moneys have been given to up-date rolling stock and to improve the bed. With the exception of the Northeast Corridor, inter city passenger rail transport in the US holds only a very small share of the markets where it is offered.

The Canadian experience with the inception of VIA Rail in 1977 is similar. Again the aim was to device a strategy which would remove the burden of loss making passenger services from essentially freight railroads and at the same time maintain adequate passenger services. VIA Rail was established with the aim of providing transcontinental

services and services on the Windsor–Quebec City Corridor. As with Amtrak it bought track space. In this case, it cost about 5% of the full financial cost of the track supplied by CN (although, of course, this was a publicly owned corporation) and CP with variations by tonne-kilometres covered and by specific link. Again the system has not proved successful in generating sufficient patronage to keep a full network operational.

One of the features of both the US and Canadian experiences is that the organisational structure adopted was an attempt to graft a passenger services onto networks of integrated freight railway companies. Equally, one might add that the policies were not designed with the objective of maximising economic efficiency but rather to resolve serious fundamental problems with wider rail transport policies. In consequence, while in theoretical terms, one could easily say that the outcomes of these separations have simply confirmed *a priori* economic expectations, namely that public monopoly supply of operations is unlikely to maximise efficiency, this must be tempered by the peculiarities of the institutional arrangements which have existed. There has obviously been little incentive for the passenger operators to be flexible and innovative, but equally it would have been strange for the track suppliers to do other than pursue strategies which would favour their own freight activities.

Private monopoly operations/public track

New Zealand has been innovative in several respects with regard the way transport infrastructure is treated; it has, for example, a direct user charge for road freight transport and extends this to rail transport. Considerable emphasis has been placed on retaining possible scale and network benefits of co-ordinated operations, including linking ferries services. The core policy in New Zealand has been to attempt to inject greater efficiency and open up the resource base by privatisation of the operations of New Zealand Rail (both passenger and freight) through a trade selling to a New Zealand–US consortium. At least part of these operations are ultimately likely to floated on the stock market. The shadow of competition is retained by the ability of the New Zealand government, which still retains ownership of the track, to introduce other operators if freight and passenger traffic falls below critical levels. Further control is possible through the level of national and regional subsidies provided to the operator.

A particular variation on this theme was been introduced in Argentina in 1991. Because of the run-down nature of much of the system considerable emphasis has been put on mechanisms which will generate investment. As a result, Argentine Railways has granted, after tender, a number of area monopolies for freight operations. These private companies will invest in up-grading the facilities and maintain operating rights for stipulated periods on track still publicly owned. The necessary economic rent for the investment is anticipated to come from the market dominance each company enjoys. In particular, differing gauges make is impossible for the three monopolies so far created to encroach on each other's domain.

Private competitive operations/public track

In contrast to the idea of a monopoly operator buying capacity in a monopoly (or oligopoly) track market, the UK government, in line with several other European countries, has been exploring the possibility of privatising more of the nation's rail operations but with retained public ownership of the track (UK Department of Transport, 1992a,b)[12]. Given the greater importance rail passenger transport has in Europe the reasons why this is being done are a little more complex. It also comes at a somewhat later time than the North American changes. In part, the interest should be seen as a device to attract new investment into the system – private firms being considered to have better access to capital – but equally there is concern that efficiency is not maximised under public ownership and that private sector involvement would reduce the element of shelter currently enjoyed by British Rail. The degree to which a private system would respond to consumer demands and provide the price–quality mix the customer wishes, of

course, depends on the degree of effective competition available. It is considered in the UK, in particular, that a monopoly private undertaking is unlikely to prove more dynamic or market oriented than a nationalised concern. This, is however, open to some debate. The extensive UK motor way network which parallels many of the InterCity lines coupled with a reasonable, and effectively deregulated, domestic air transport network over longer routes means that InterCity operations are, in fact, open to actual as well as potential competition within a privatised railway structure.

The method of privatisation selected (as expressed by the Railways Act 1993), at least at the outset, is to establish a separate Railtrack Company to control the basic rail infrastructure[13] and to then franchise a number of services currently being supplied by British Rail.[14] In the longer term an increasing number of services will be taken from British Rail. A Franchising Authority will be responsible for the process. The anticipation is that some of the routes will attract positive bids but that others will require subsidies and hence go to the operator seeking the lowest subsidy. Railtrack itself is seen as a cost recovery concern which, while initially remaining in the public sector, will be independent of British Rail (UK Department of Transport 1993a). It will operate on the basis of a 10 zone network with most of its £1 billion annual infrastructure maintenance programme undertaken by 14 service companies which are currently part of British Rail's profit centre organisation. The subsequent cost of use borne by operators will be on an avoidable cost basis with differential contributions to common costs according to ability to pay.[15] Where conflicts arise over 'paths', willingness to pay (i.e. ability to pay) will, after an initial transition phase, determine the outcome. This may well mean that commercial services gain priority over subsidised services even if the latter are supported by the Franchising Authority. Some freight traffic may avoid part or even full payment (and receive a government grant) if it is demonstrated to generate a social benefit by not going by road.

The programme of passenger operations privatisation has gained in its scope over time and now embraces some 20–30 groups of services. The seven services which were initially singled out in February 1993 for franchising in February 1994 (with British Rail operating a shadow franchise arrangement in the interim) included three important InterCity passenger routes.

- The East Coast Main Line which in 1992 had revenues of £210 million and carried 26,000 passengers a day.
- The Great Western Line from Paddington to Penzance and Fishguard Harbour.
- The Gatwick Express linking the airport to Victoria which carried 5 million passengers in 1992 and generated £25 million in revenue.

In May 1993 a further 18 rail services were added to the list for franchising. Included were a number of InterCity routes of which the West Coast Main Line was one and the Midland Main Line another. These are less attractive commercial propositions than, particularly in the case of the West Coast Main Line, extensive investment is required. To lubricate the process, funds have been made available for the refurbishment required on these routes. The West Coast Main Line, for example, which last benefited from major investment twenty years ago, is estimated to require some £400-£500 million being spent on it over the next seven years if it is not to become dangerous; initial proposals for the investment are being examined by the Franchising Director in 1994.

The reaction of the private sector to the new situation has been rather luke warm. In part this may be explained by initial political wrangling over whether British Rail would be allowed to bid for franchises (under strong opposition from the government they are to be permitted) and over pension obligations – which the government has now agreed to act as guarantor for. In several cases where there are potential bidders many of these are existing bus operators interested in developing individual routes within their traditional areas of operation. They feel there are network benefits to be gained by providing passengers with integrated services. It is not yet clear how this will fair under UK competition control policy.

Rail freight is also included in the privatisation process (UK Department of Transport 1993b) with proposals to create three regional private freight companies to take over trainload and service contract activities. The companies will have first choice of British Rail rolling stuck and locomotives and retain the contractual obligations of British Rail. The companies will then buy track space from Railtrack. Existing customers of British Rail may also elect to enter into direct negotiations with Railtrack to buy 'slot' directly from it.

Public operator/public track monopoly

Sweden has moved somewhat faster than the UK in its efforts to separate operations from track and has done so within a different institutional framework. Under a successive string of policy reforms in the 1980s (Jansson and Cardebring 1989; Banks 1992) the Swedish authorities attempted to improve the financial performance of Swedish Railways. This culminated in 1988 with measures to separate some of the operations of Swedish Railways (*Statens Järnvägar*) from the ownership of the track. Swedish Railways, which is state-owned but in its activities autonomous of government, was given responsibility for operations while the National Railway Administration (*Banverket*) stays in control of the track. A limited number of routes were also put out for tender; the public operating company won all but one of the contracts with the private concern BK-Tag gaining two passenger lines.

The actual charges levied on the operating companies, unlike the UK private/public model, are not designed to enable full track cost recovery but only about a third of its costs (although these do embrace estimates of externality costs). Further, and to make the charging regime comparable to the charging for road use, the track authority charges contain both a fixed and variable cost component. Clearly it is early to comment on the impact of the system, especially since its initial years have seen a 45% annual rise in investment in rail infrastructure. What the public operating company fears in the longer term is that, while it has a remit to operate commercially (with the government buying socially necessary services through subsidies), the track authority may make investments on other, conflicting criteria (Larsson 1992). The situation, however, seems to be in accord with the underlying policy of achieving broader social goals at the lowest possible cost. The extent of the managerial co-ordination problem is also likely to be limited by the ability of the operator, unlike in the UK case, to be extremely proactive in terms of the track facilities required to meet the services it wishes to supply.

Private operators/private partnership owned track

With the removal of many regulatory constraints, and accepting that the bulk of scale economies are in the track side of rail service supply, there is an increased incentive for rail undertakings themselves to begin to seek ways of vertical separating infrastructure from operations. This would seem to be particularly so in the context of the long standing duopoly structure found in Canada. One manifestation of the changing commercial environment, albeit small in comparison with rail developments elsewhere, has been efforts by CN and CP Rail to rationalise operations in eastern Canada and in particular to consolidate operations in the Ottawa Valley where traditionally they have operated parallel infrastructures.[16] A joint subsidiary company will control and maintain a single line with the two operators offering competitive services on it by buying a path from this partnership company. Additionally, VIA rail passenger service would operate under existing agreements.

In these types of situation where, when confronted with conditions of falling demand, the costs of infrastructure duplication, in the context of decreasing costs of providing infrastructure services, seem to be increasingly out weighing any allocative efficiency gains associated with competition between infrastructure, partnership arrangements may be socially, as well as commercially, sensible in the short term. Longer term difficulties could emerge, however, if policy moved in the direction of allowing common access to

track. If, as under European Union regulations, this implied access at rates comparable to the partnership undertakings then questions of unfare competition would be avoided. This would, presumably, require statutory measures. Additionally, however, there is the more general question of the rates to be charged operators. Unlike a public track authority with a remit to meet specified social criteria, or a private track concern dealing with a monopsony operator, the track company has considerable market power and, *ipso facto*, the ability to levy non-cost related charges. This is even more the case if the track company is made entirely independent of the operating companies.

Regulatory Issues

Railways have been regulated almost since their inception (for example, since 1844 in the UK) and in many countries have involved either direct, or indirect, public financing of their activities. Moves to separate track from operations, therefore, inevitably raises issues of the appropriate regulatory framework to install in a post vertically integrated World. Much, of course, depends both on the form of vertical separation adopted and the objectives being pursued. A number of more general issues can, though, be highlighted.

Maximising efficiency

Different countries are clearly pursuing different paths in their efforts to separate operations from track matters. In part, and because of the high costs involved in even marginal changes to its nature, these variations are influenced by the character of the vertically integrated rail network which is to be divided. In the case of countries where there has been considerable under investment in infrastructure in recent years, and where the shadow cost of external financing is high, conferring monopoly rights on an operator for a period provides both the ability to invest in the track system, even if it is owned by another body, and the ability to generate the economic rent required for this. In a sense, the role of regulation in this environment is to ensure that such rent is attained.

In most industrialised economies this is not, however, the major problem. The issue is to find ways of making more efficient use of a mode of transport which is gradually losing market share. There is also often a residual interest in attracting some funding for a certain amount of redevelopment of links which have more buoyant prospects. Technical and dynamic efficiency in these circumstances would tend to favour as much competition in markets which exhibit constant costs of supply. This is why the UK has favoured its strongly market oriented, private sector approach to operations. Unlike Sweden and, to a lesser degree, New Zealand where monopoly operations are seen as preferable, the UK is also a country where this strategy fits in with the overall regulatory ethos. While market failures are accepted as an inevitable element of any liberal regime, the UK regulatory philosophy of the past fifteen years has centred around the notion that workable competition is likely to be less distortive and lead to higher levels of efficiency than a strongly controlled environment.

Subsidies

Whichever model one reviews there are problems when moving away from the simple question of efficiency towards examining the ways of attaining wider goals and, especially, the provision of social services. Cross-subsidisation, which was common under the regulatory regimes found accompanying many monopolised and vertically integrated railways, is demonstrably inefficient in the short term and provides little stimulus for improvements in the long term. Separating track and operations into two monopolies, along the Swedish model, is only likely to reduce these problems if there are accompanying changes in the regulatory framework. Without these, there is limited incentive for the operating company to do other than mimic previous strategies when vertical integration existed.

The New Zealand approach of allowing the private company taking over its operations to essentially act as a commercial concern does, as we have noted, have the legal fall back position that competition can be initiated if capacity is cut below specified levels.

The interesting question then becomes the degree to which it is in the operator's interest to maintain a degree of cross-subsidisation before this threshold is reached. Further, if it does need to continue cross-subsidisation, then there is the policy matter of whether the pattern of cross-subsidies, which will emerge in this purely rent protecting strategy, deviate to that which would maximise welfare at the given asset transfer level.

Direct subsidies are easier to handle when there is a competitive operations market. They can be embraced within a franchising framework and there are a number of possible mechanisms for ensuring that problems often highlighted by economists, such as the capture of the system by incumbent franchise holders, are minimised (Anderson 1993). The issue then becomes one of who administers the subsidies. In the UK the system is structured to operate through the Franchising Director but equally there should be no reason why any local community or regional authority may not provide subsidies to operators serving their areas.

Co-ordination

A further issue is the matter of the logistics of managing operations over a rail track network. A monopoly operator must internalise this problem and develop its own service frequencies. The issue is much more complex when there is competition between operators, especially over an extensive, heavily used and complex rail network.[17] These types of difficulty are likely to be particularly pronounced, therefore, in the context of the European system. One initial approach, and the one deployed in the UK, is essentially to initiate competitive bidding for parts of the existing timetable over clearly defined segments of the network (see Starkie 1993). One could then think of subsequent trading of parts of these segments between operators as the dynamics of the system bring about the desirability of new timetables and reformed services. To retain competitive (or contestable) forces in this context would require some form of regulation – a function which is effectively performed by the Franchising Director in the UK.

Monopoly power

The key regulatory issue regarding rail track infrastructure provision is that of controlling the potential monopoly power which could be exercised by either the public or private supplier. Of course, the degree of the monopoly enjoyed depends on the level of competition from alternative modes in the short term and the ability of users of the system to relocate, and thus change their transport dependence, in the longer term. It also depends on the relative power of the operators; a monopsony operator having more leverage over the track owner than when there is competition amongst operators. Institutionally a number of possibilities are currently being experimented with to contain the monopoly power problem.

When there is public ownership of the track it is comparatively simple to limit monopoly exploitation by imposing rate of return regulation[18]. This, however, is recognised to lead in the long term to potential over investment (since there are usually a locus of possible capacity/charge regimes which offer the set rate of return) and to possible technical inefficiency. In the UK case, to combat these problems the Franchising Director acts as a buffer between the operators and the Railtrack and, hence, effectively maintains strong 'purchasing' powers. One could argue that direct price-capping regulation as used in other sector of the UK economy, such as electricity where there has also been vertical separation, may be a more effective procedure with the Franchise Director merely serving a clearing house function. While price-capping regulation has the well known advantage of a closer principal-agent relationship, if for no other reason than that the costs of gaining information is lower, it is more effective in industries experiencing rapid technical progress and, consequently, continually changing cost structures. Rail track does not seem to fall into such a category.

Similar types of difficulty are likely to be encountered in Canada if the need for freight rail rationalisation found in recent studies are valid[19] and their freedom to respond in

newly competitive transport markets remains excessively regulated (Canada House of Commons Standing Committee on Transport 1993). If the operators do seek to rationalise costs through setting up quasi independent track arrangements this has implications for the underlying government strategy of the two railway policy. More explicit forms of direct regulation would seem inevitable but their exact form seems uncertain at this stage. As an alternative approach the state could take over responsibility for the track and device an overall structure not dissimilar to the UK model with bidding taking place for paths.[20] The same difficulties inherent in the UK approach, namely allocation of paths, funding investment and regulating the track undertaking would emerge and need to be resolved.

Pricing the infrastructure

Vertical separation of track from operations inevitably means setting a price for the infrastructure. One problem is that discussed above, namely the fear of monopoly exploitation by a unitary supplier, but equally even if regulations are devised to contain this there is the difficulty of setting price to ensure full costs are recovered. The unattributable common cost problem which bedevilled integrated systems is, therefore, not removed but rather reduced and pushed back a stage. There is some debate about the extent to which common costs exist, but even the studies which provide the lowest estimates still produce figures of around 30% of track costs[21]. To recover costs there is a need for some arbitrary allocation of some parts of the fixed costs involved. Regulation here, where some form of discrimination is inevitable, is needed to ensure that this mark-up on marginal costs is consistent with an agreed set of principles. In the UK this is crudely being done on the basis of the conventional Ramsey pricing criteria with those showing the greatest willingness to pay making the largest contribution to the common costs. If equity or regional development considerations are important there may be a need to pursue some other course and the function of the regulations would be to ensure this is done.

Some Concluding Thoughts

A cursory glance through any transport history will show that in virtually every country there are frequent, and often quite dramatic, changes in transport regulations and in the interpretation of those regulations. Longer cycles are also discernible and the on-going trend is one towards seeking regulatory environments which achieve high levels of technical and dynamic efficiency within transport industries. In the case of most railway systems this is taking place at a time when traffic levels are falling and following a period when investment levels have failed to maintain the physical integrity of the capital stock. As a result there has been a serious questioning by many countries of long held beliefs regarding the best way to restructure the industry. This questioning has been influenced by an improved understanding of the underlying cost structure of rail transport supply.

The notion of vertical disintegration is not new but its resurrection as a practical policy approach is timely in that it offers both the opportunity for greater internal efficiency within railway industries and the potential, through sensitive franchising arrangements, for better use to be made of public subsidies. It has the added advantage, in some formulations, of revealing exactly which types of operations are profitable. Actual experiments with various forms of separation are under way in different countries and it is too early to reach conclusions about the overall effectiveness of vertical disintegration or the particular form it should take. What does seem to emerge is that vertical separation can take many forms and be tailored to a variety of different national needs. There does not, therefore, seem to be some utopian model of vertical separation to aim for but rather a range of bespoke options which can be cut to meet particular national circumstances and objectives.

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Endnotes

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1 For example, in the Canadian context, 'The possible ownership of a company's right of way is an important subject, and certainly a controversial one. But it is also somewhat of an under explored one as well, particularly from the standpoint of how a property should be operated', (Maroti 1985).

2 As pointed out by Gratwick and Heaver (1985), 'An alternative approach to rail privatisation which we believe should be raised again is a radical departure from current thinking. The suggestion has been made at other times that public ownership of the right-of-way of both CN and CP would enable railway services to be provided in a more competitive environment than would otherwise be possible in Canada. Although raised following the Western Economic Opportunities Conference 1974, the proposal has not been given extensive and serious consideration.'

3 Disregarding the issue of whether transport policy can significantly influence economic performance to any extent, one reason for this shift of emphasis is that transport costs represent a relatively smaller proportion of overall production costs than in the past and hence the potency of the policy instrument is weaker.

4 The change in the specific context of Canadian railways is discussed in Ludwick (1993).

5 From the data which is available, it would appear that industries which have enjoyed, to adopt Leibenstein's (1966) terminology, an extensive degree of 'shelter', either in the form of public ownership or alternatively protection from the full rigours of competition, have also exhibited high levels of technical (or X-efficiency) – see Button and Weyman-Jones (1992).

6 Waters (1985) provides a comprehensive guide to these recent developments in the context of railway costing analysis. One might add here that the influence of the applied economic work on policy discussions in this area of vertical disintegration adds weight to Winston's (1993) recent analysis about the power of quantitative analysis in shaping regulatory reforms.

7 The European evidence is somewhat less conclusive than for US freight railroads, possibly because of their mixed traffic (which makes it difficult to isolate economies of scale and density from economies of scope) or because of the effects of direct public control which may itself influence cost levels. McGeehan's (1993) evidence, for instance, indicates a broadly horizontal cost curve but Preston (1994) finds a U-shaped curve.

8 Keeler (1983) conveniently surveys the literature on density.

9 Even here there are a wide variety of variants which usually are governed by the intrinsic nature of the market involved; its size and its dynamism. Given the considerable amount of change which has taken place in the UK since 1980, developments there provide a useful set of examples of what privatisation may mean. In the context of the privatisation of the National Freight Corporation in 1982 and the sale of elements of the National Bus Company following the 1985 Transport Act, the competitive nature of the market and the relatively low capitalisation involved led to worker and management buyouts. With larger undertakings, such as British Airways and the British Airports Authority, in part because of the capital requirement, public sales of shares in the company have taken place. Alternatively, as with British Rail's Sealink ferry operations, the undertaking has been sold as a trade sale to an existing supplier in the market.

10 Strictly, it is a private, for profit corporation supported by the government (Tobey 1987).

11 In the cases of the Boston area and Southern California Amtrack is contracted by public track authorities to operate services.

12 A number of alternative methods of privatisation have been considered in policy debates, see Adamson *et al* (1991) for a discussion of their natures. For an account of the structure adopted see, Nash (1993); Glaister and Travers (1993). A critical assessment of the structure is contained in UK House of Commons Transport Committee (1993). Else (1993) explores the potential efficiency effects of the system.

13 In order to ensure that users have full information regarding services, Railtrack will be responsible for publishing a full timetable.

14 Prior to this there had been partial privatisation of British Rail activities through the sale of its ferries and hotels. Additionally, many functional activities, such as catering, engineering and cleaning have been privatised. Perhaps more germane to this paper, a very small inroad into the public sector monopoly of long distance rail services was made for a time by the addition of private coaches (e.g. by Stagecoach in Scotland) to BR services.

15 The powers of Railtrack to meet this objective are controlled by a regulator who, amongst other criteria, must abide by EC Directive 91/440 which places a requirement on railway infrastructure managers not to discriminate between train operators in the fees they charge them for the use of infrastructure.

16 In fact this type of approach to the financial problems confronting rail transport in Canada is very much in line with recommendations of the National Transportation Act Review Commission (1993), *viz*, 'We recommend that the government encourage CN and CP Rail in their joint rail plant usage initiatives by developing policies and practices which are supportive of such initiatives.'

17 The problem in the context of passenger operations is well expressed in a quotation from Adamson *et al* (1991). 'The availability of platform space at a given time would in turn affect the availability of paths on other routes, and so on. Hence all scarce capacity which critically affected other stress points on the network would have to be simultaneously traded and subsequently operated in a co-ordinated manner to ensure efficient competition. If a tenderer were not successful in its initial bid, it would have to re-optimise iteratively its needs for paths through the network to arrive at a second choice, in the light of the fact that some paths were already committed to a competitor. the interdependence inherent in train planning would make time tabling with competitive bidding a tortuous process, with the likelihood of unclear product definition and unstable prices'.

18 One of the problems with the rail sector in many countries, however, is of existing excess capacity, well above that likely under a rate-of-return regulatory regime, coupled with extremely long waits for returns to be made when investment is undertaken. Defining appropriate institutional frameworks to stimulate investment in the short term is particularly difficult (Helm and Thompson 1991).

19 For example, 'based on these findings we conclude that neither CN Rail nor CP Rail can be considered financially viable if their financial performance during the three years 1989–91 is not improved', (National Transportation Act Review Commission 1993).

20 This should be put in the context of recommendations from the National Transportation Act Review Commission (1993), which were not accepted by the Standing Committee on Transport, that '...the Minister of Transport commission a comprehensive study of the feasibility of separating railway operations from the ownership and maintenance of rail plant' and '...the Minister and of Transport and the Agency explore the possibilities of making trackage in eastern Canada available for use by any rail carriers on a pilot project basis to test the common user rail plant concept'.

21 This estimate comes from an Australian study by Beesley and Kettle (1985) who found that about 20% of system total costs and 30% of track and signalling costs were common . The UK position which underlies its policy is that, 'Work carried out...has confirmed that the majority of rail infrastructure costs are common, that is, they cannot be uniquely attributed to any particular operator or even class of operator. The majority of costs also tend to be fixed, at least in the short to medium term' (UK Department of Transport 1993a).