Organizational Regimes for Commuter Rail:

An International Perspective

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Organizational Regimes for Commuter Rail: Improving Train Service Worldwide

ABSTRACT:
To customers, commuter rail is a form of regional transit, but operationally it is part of the overall railroad system. Therefore, developments in the ownership and control of railroads affect commuter rail. On systems worldwide, there have been enormous changes in ownership and control of tracks and trains. How these rights should be organized and exercised is a subject of ongoing debate.

The policy debate on railroads has focused largely on freight and intercity passenger service. This paper examines how organizational regimes affect commuter rail in North America, Great Britain, Australia and Argentina using a functional framework. Despite great differences in organization of the overall rail systems, many cities in different parts of the world have been moving towards greater regional autonomy for commuter rail since 1970. Commuter railroads should seek to obtain and protect as many of the benefits of vertically-integrated forms of organization as possible, to avoid the potential difficulties of infrastructure separation while accommodating all types of rail traffic.

Where open access is mandated by national policy, authorities can protect commuters' interests by consolidating purchasing power for train paths, reducing institutional complexity, realigning infrastructure zones, and reducing the interfaces between infrastructure and operating units as much as possible.

Commuter rail is becoming an increasingly important part of regional transit, but it differs from other rail modes by using the general railroad system, sharing infrastructure with other rail traffic. Since the 1970s, fiscal and political pressures have produced lasting changes in the institutional organization of railways (including commuter railroads) in many parts of the world. Railways have undergone such changes as bankruptcy, nationalization, corporatization, privatization, mergers, sales of surplus lines, concessioning, and infrastructure separation. Governments addressing troubled railroads have selected various organizational regimes. Although policy initiatives differ, there are some common trends:

- Commuter systems are now managed with more local control than previously, with local authorities providing financial support, setting fare policy, dictating service standards, and requiring accounting transparency from service providers.
- With increasing local control, local governments have been much more willing to purchase and invest in fixed infrastructure to support commuter rail. In some cases, entire operating railroads have been brought under public ownership.

In the increasingly worldwide policy debate on railroads, North American and European models of railway organization are being compared, contrasted, and evaluated for their suitability in settings worldwide.[1] This paper examines experiences from metropolitan areas around the world operating under different organizational models.

Case studies show how these changes have affected commuter rail, and identify factors that local and national governments should keep in mind when designing policy initiatives to restructure commuter rail and general railroad operations. Commuter rail advocates should also consider these factors in their legislative agenda, to ensure that national rail policy safeguards commuters' needs. This analysis also suggests how different functions might be organized within a commuter railroad to minimize the negative impacts of the national rail landscape.

UNBUNDLING THE RAILROAD: ASSETS OR FUNCTIONS?

Traditionally, the literature on railway organization considered an operating railroad from an asset point of view:

> A railroad is a "bundle" of assets including track, signals, bridges, tunnels, yards, shops, locomotives, freight cars and passenger coaches. Historically, the world's railroads … developed as monolithic organizations, controlling the entire bundle of assets and operating their own trains while restricting access by other train operators. … (M)any nations have ordered a separation of rights-of-way from train control – unbundling.[2]

This "unbundling" process, also known as infrastructure separation, has been mandated for national railways in the European Union (EU), and

[1] José A. Gómez-Ibáñez, "Railroad Reform: A Review of the Options." Presented at the Conference on Railway Reform, Madrid, Spain, September 2004.
[2] Frank N. Wilner, "Competitive Access: Lessons From Great Britain," *Journal of Transportation Law, Logistics and Policy*, No. 2, Winter 1998, p. 182.

> is generally aimed at separating the natural monopoly component of railways (infrastructure) from the potentially competitive component (train operations), thus promoting more intensive use of infrastructure and competition between operators. The separation may also be achieved while retaining a single organisation, by requiring accounting separation … so that the costs of track use are clearly identified… [3]

As the complexity of dispatching, trackage, and haulage right agreements grows, as organizations increasingly outsource specific functions, and as public authorities sell and lease back capital assets, the asset-based model has become outdated. This paper analyzes the organizational regimes of commuter railroads using a function-based framework. The *functions* (and control) can have dramatic consequences for operations if unbundled inappropriately, even if the same company ostensibly controls all functions (as shown by certain US freight railroads following major acquisitions in the 1990s). Conversely, the unbundling process (even across different companies) does not necessarily create problems if operating control of these assets is harmonious. The main functions analyzed mirror the typical internal organization of a traditional railroad:

- **Infrastructure Maintenance and Construction** includes all activities that support the railway's fixed infrastructure but does not involve operating trains or facilities. This typically includes track, signal, and structural maintenance, and engineering.
- **Service Operations** includes all carrier core functions, typically encompassing service design, scheduling, crewing, supervision, dispatching, cleaning, capital planning, marketing, and revenue collection.
- **Vehicle Maintenance and Procurement** supports the rail vehicles, but excludes operating them. Typically, this includes heavy maintenance, rehabilitation, procurement, engineering, and design.

Infrastructure Separation: A Matter of Degree

Since 1993, it has been EU policy for railways to adopt separate accounting for operations and infrastructure, even if two companies held by the same national railways agency perform these functions. Train operators and infrastructure owners must have an arms-length relationship. Although metropolitan and local railways are exempt from this requirement, national railways provide most commuter services.

The US and Canada have not unbundled their railroads through European-style infrastructure separation. Instead, commuter rail and intercity passenger train operations have been disaggregated from freight through operating agreements and track ownership changes. The intent is to make freight railroads more competitive by having public agencies take financial responsibility for passenger services (and in some cases operating responsibility as well). However, in the US, recent years have seen calls for increased rail freight economic regulation and even a proposal for infrastructure separation in the Northeast Corridor.[4]

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[3] Margaret Starrs, "Rail Reform Models," in *Proceedings, 23rd Australasian Transport Research Forum* (Perth, Western Australia, 1999, p. 61).

[4] Wayne O. Burkes and Michael F. McBride, "A New Twist to Amtrak's Annual Kabuki Dance," *Journal of Transportation Law, Logistics and Policy*, 3rd Quarter, 2005, pp. 379-387.

Although the distinction between vertical integration and infrastructure separation is often seen as absolute, the critical variable is the degree of separation between train operation and capacity allocation functions (scheduling and dispatching). Table 1 shows the range of organizational regimes existing on commuter rail. A North American carrier operating under trackage rights can have the same difficulty with operations control as a European open access carrier operating over infrastructure where it is not the dominant user. Conversely, an open access carrier with market dominance over a geographic locale can indirectly achieve approximately the same level of control over the infrastructure as a vertically integrated railroad.

Internal Organization is Important

How functions are allocated between different companies is important, but equally important is the *internal* organization within a large and complex institution. The effectiveness of organizational models depends on the mechanisms for control, communication, and coordination between different service delivery functions.

Vertical integration is seen as effective because a traditional railroad organizational structure allocates operating functions in a way that allows each department to be held accountable for its performance and simplify the coordination across departments required to achieve effective operations control. An infrastructure-separated, concessioned, or contracted service delivery regime in which these clear lines of accountability are preserved can function as if the institutions were a cohesive whole, although this may be difficult to achieve in practice. Where many vertically integrated carriers co-exist in the same metropolitan area through a complex exchange of trackage and other rights, resulting in fragmented operations control, coordination issues similar to those of open access networks may arise if institutions do not cooperate in good faith.

Commuter Rail and Control of the Carrier Core Functions

A vertically-integrated North American commuter railroad serves the riding public well when it retains control over the most critical carrier core functions – service and schedule design, crewing, dispatching, capital planning, and marketing. Maintenance or operations may be contracted out, and assets may be privately owned. But as long as the commuter agency retains overall control and provides adequate oversight, customers will be well served. Conversely, even with complete control under vertical integration, a commuter railroad will perform poorly if inadequately supervised.

Infrastructure separation can complicate commuter rail operation, because complete control over the carrier core functions is not possible. This becomes particularly problematic when multiple operators compete for limited capacity. The local authority can approximate control of the infrastructure through such strategies as:

- Consolidating operations to become a major purchaser of train paths in a corridor or metropolitan area.
- Aligning infrastructure management zones with those of the corridor or commuter district to minimize the number of trains crossing management zone boundaries.
- In areas of high traffic density, upgrading infrastructure to isolate operating perturbations elsewhere in the network from the commuter district.

- Providing incentives for performance improvements through bonus payments and/or penalties.

A commuter service operating under trackage rights or purchase of service contracts, or where the commuter carrier does not have dispatching rights, is like one that operates under infrastructure separation in that indirect methods are necessary to achieve good performance. For this to work smoothly, a commuter rail agency must have very good relations with track owners.

Although the full-service railroad providing commuter, intercity passenger, and freight service continues to make sense operationally, today's political and financial landscape demands more transparent cost allocation in each sector. Both infrastructure separation and vertical integration have mechanisms for allocating infrastructure costs. Both have distinct advantages and disadvantages.[5] For instance, under vertical integration, promising commuter rail corridors may not be developed if a host railroad refuses to grant trackage rights or restricts available train paths.

As a pragmatic matter, commuter rail agencies should seek control of the railroad where circumstances permit – and they should be wary of attempts to implement such measures as open access that would wrest control away from commuter agencies. If possible, the agency should obtain control of all carrier core functions within its jurisdiction. Even if the functions are franchised back to the former operator, the threat of revocation may be sufficient to ensure good performance.

With public agency control comes responsibility to the overall railroad industry. When commuter railroads own congested trackage in urban areas and invest in core railroad capacity, they have a duty to let other trains use these routes responsibly so that society gains the greatest benefit from the rail network. Under vertical integration, host railroads maximize the value of their franchise by partnering with other operators to attract investment capital and track access revenues, much like infrastructure companies under infrastructure separation.

NORTH AMERICA: VERTICAL INTEGRATION AND OPERATING AGREEMENTS

The tradition of vertical integration has shaped North American commuter systems. In the US and Canada, track owners operate trains over their lines and normally dispatch the lines they own. Often, railroads allow other railroads to operate on their lines, through agreements negotiated for mutual advantage, inherited from former owners, or mandated to preserve competition as a result of mergers and acquisitions. "Today, there are many thousands of kilometers of … trackage in the US over which at least two, and often more, railways operate regularly and safely."[6] But aside from Amtrak, no carrier has an automatic right to use another railroad's tracks.

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[5] Alex Lu, "Vertical Integration Versus Infrastructure Separation for Railroads: Different Optimums for Different Settings?" in *Papers, 81st Annual Meeting of the Transportation Research Board* (CD-ROM, Washington, DC, 2002).

[6] Louis S. Thompson and Helene Stephan, "Infrastructure Separation: what have we learned so far? *Railway Gazette International*, Rail Business Report issue, 1998, p. 7.

Until the 1970s, North America's freight railroads also operated commuter and intercity passenger trains, receiving subsidies only in certain northeastern US jurisdictions. The creation of Amtrak in 1971 and Via Rail Canada in 1978, along with the establishment of commuter rail agencies, have led to a more complex situation. Congress mandated a transfer of responsibility for commuter rail from Conrail to commuter rail agencies or Amtrak effective January 1, 1983. Some lines have changed ownership. On other lines, agreements allowing commuter agency trains to use Amtrak or freight railroad tracks, are common. North American commuter rail properties now operate under arrangements which differ from line to line and even along certain lines.

Variety of Agreements

Under a *purchase of service contract*, a commuter agency pays a host railroad to run trains on a mutually-agreeable schedule, with the host (which may be Amtrak or a freight railroad) providing operating crews. Examples include Metra's BNSF and Union Pacific lines in Chicago, and MARC in Washington and Baltimore. There are also variations on this theme. In Seattle, host railroad BNSF provides operating crews for Sound Transit commuter trains, but Amtrak maintains the equipment. In Toronto, GO Transit now subcontracts with a private firm to operate trains on Canadian National (on GO Transit's single Canadian Pacific line, the host railway continues to provide operating crews).

Under a *trackage rights agreement*, the agency pays for the privilege of running its trains on a host railroad's track, with agency employees (who must be fully qualified on the lines). Examples include Metra's South West and North Central Services in Chicago, as well as New Jersey Transit (NJT) and SEPTA on Amtrak's Northeast Corridor.

Since the 1970s, several commuter agencies have purchased lines from freight railroads. On these lines, commuter railroads operate their trains with their own employees, and freight railroads pay the commuter agency for trackage rights on these agency-owned lines. Examples include New York's Long Island Rail Road, Chicago's Rock Island District, and several lines in Boston, New Jersey, and Philadelphia. Typically, freight railroads retain "perpetual and exclusive" trackage rights.

Commuter agencies may even own tracks that are dispatched by freight railroads. Canadian Pacific, the successor to the former Milwaukee Road beyond Chicago's two Metra-owned Milwaukee District lines, dispatches both commuter lines. Similarly, GO Transit owns the approaches and the tracks through Toronto Union Station, but Canadian National continues to dispatch this segment.

Several arrangements reflect historical circumstances. The South Shore Line reaches Chicago on Metra Electric under an agreement originally negotiated in 1912 by the predecessors of both operations. New York's Metro-North and Connecticut own their respective parts of the New Haven Line, with Connecticut reimbursing operator Metro-North for its share of the costs. Amtrak has trackage rights on Metro-North between New Rochelle, N.Y. and New Haven, Conn. (the only part of the Northeast Corridor not under Amtrak's operating control). West of the Hudson River, Metro-North owns and maintains the New York State portion of the Port Jervis Line, but NJT dispatches the line, and its crews operate the trains.

Historical developments also affect how commuter rail agencies accommodate certain travel markets. For instance, Amtrak trains under state sponsorship (Empire

Service) and multi-state coalitions (Downeaster, Hiawatha Service) use lines owned by commuter agencies. Sometimes, though, commuter agencies serve comparable-length travel markets themselves (LIRR Montauk Branch, South Shore Line).

Safeguarding Commuters' Interests Through Operating Control

In North America, agency control of operations best safeguards commuters' interests. Agencies have purchased an operating railroad (Long Island Rail Road), created a new commuter railroad after purchasing rail infrastructure assets (Metro-North), and even purchased operating control and rail assets while contracting out operations to the former owners (MBTA in the Boston & Maine era).

Where commuter agencies lack complete control over carrier core functions such as dispatching, additional incentives are needed to obtain cooperation from companies that control key operating functions. Some freight railroads have responded positively to contracts which provide bonus payments for good on-time performance.[7] But these incentives may not be sufficient where track capacity is at a premium.

Commuter rail agencies often invest heavily in tracks and other facilities. Agencies have substantially rebuilt dilapidated lines or rehabilitated secondary lines (MBTA, Metro-North, NJT, SEPTA, Metra), restored or extended service, built new downtown stations and tunnels, and added track capacity for commuter trains (SEPTA, GO Transit, MBTA, Caltrain).

In Massachusetts and New York, states have become *de facto* owners of intensive commuter trackage. Yet these states have also been proactive in developing freight and Amtrak service on their lines, inviting new operators through trackage rights or franchises. On the Northeast Corridor in Massachusetts, the state considers the intercity service so important that it allows Amtrak to dispatch the entire state-owned line from Boston to the Rhode Island state line. In Connecticut and New York, however, Metro-North has retained dispatching control.

Chicago and New York are seeking greater cooperation in commuter-intensive territory. To better manage their interrelated Chicago area operations, the major freight railroads created the Chicago Transportation Coordination Office. Supervisors from all member railroads are on hand at Metra's dispatching center, which was chosen because the freight railroads see Metra as impartial. "Metra delays due to freight interference have decreased by 50% since the [clearinghouse's] inception."[8] In New York, Amtrak and the Long Island Rail Road (LIRR) share dispatching control of the Amtrak-owned East River approaches to Penn Station, where commuter rail is by far the busier user.

Commuter systems function best when one entity is clearly in charge of daily operations, yet understands the needs of other users. On the other hand, where intercity and commuter services compete for limited capacity (Amtrak on Metro-North's New Haven Line, NJ Transit service to New York Penn Station), the owner may give its own trains priority.

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[7] John G. Allen, "Commuter Rail, Freight Railroads, and the Open Access Debate," in *Transportation Research Record 1704* (Washington, DC: Transportation Research Board, 2000).
[8] Tom Judge, "Fluid at last," *Railway Age*, June 2001, p. 28.

GREAT BRITAIN: INFRASTRUCTURE SEPARATION AND PASSENGER FRANCHISES

Prior to 1923, Britain had many small-to-medium-sized railways, with extensive trackage rights and through running. In 1923 a government-led process known as Grouping merged all of the smaller lines into four large geographically-based systems. With railway nationalization in 1948, British Rail (BR) took over the four vertically-integrated railways of the Grouping era in their entirety, including commuter trains. Until the early 1980s, BR operations were organized by regions, roughly corresponding to Grouping-era systems. The Eastern, Southern, Western, and London Midland Regions all had extensive commuter services in the London area. These BR regions, along with a Scottish Region added after nationalization, also operated commuter trains in larger cities outside London.

In the early 1970s, local governments in metropolitan areas outside London such as Glasgow, Manchester, Liverpool, and Birmingham formed transit authorities known as Passenger Transport Executives (PTEs). Although bus service was the PTEs' core business, PTEs also obtained additional commuter rail service through purchase-of-service contracts and made capital grants for new cars as equipment aged and needed replacement. As in North America, the new cars were generally owned by the regional agencies.

In London and the adjacent Home Counties – densely populated, affluent, and prime commuter rail territory – BR regions operated autonomously until the mid-1980s. London Transport was not involved, unlike the PTEs in provincial cities. Although London Transport has extensive bus and rapid transit service within the Greater London Area, many commuter lines extend further, sometimes 100 km (60 miles) or more from the city center. Given the operating and political complexity, the central government retained control of London's commuter trains.

British Rail Sectorization and Network SouthEast

Beginning in 1983, BR's operating regions were replaced with several business sectors: InterCity for principal passenger trains, Network SouthEast (NSE) for London commuter trains, Provincial for other local trains (including commuter rail outside London), Railfreight, and Parcels. BR's regions were retained for infrastructure management purposes.

The aim was to introduce greater budgetary efficiency and managerial accountability through sectorization, rather than privatizing BR outright. Although BR owned all five sectors, each sector was given primary responsibility for various assets (rolling stock, tracks, stations), and control resided with the primary user. Other sectors could negotiate access rights and rent facilities, using their own resources.[9]

Sectorization brought big changes to London with the creation of Network SouthEast. In contrast to BR Provincial, which was intended to operate interregional and other subsidized services, NSE was expected to cover most of its operating costs from revenues.[10] Although not all London commuter traffic was profitable, NSE assessed

[9] "Sector Management" (article series), *Railway Gazette International*, April 1984.
[10] Roger L. Mackett, "Railways in London," *Transport Reviews*, No. 1, 1995, pp. 48-50.

trackage fees to other BR sectors using its tracks and used more profitable commuter and interurban flows to cross-subsidize branch line operations. As before, the central government remained the source of capital funding for Network SouthEast.

Although NSE did not own or maintain infrastructure, it was a very strong franchise with control over almost all of the carrier core functions. NSE set its own goals and service standards in consultation with BR, and created its own management structure and oversight. BR allowed NSE to decide about scheduling, marketing, infrastructure enhancements, and rolling stock specifications on NSE-assigned lines and services. NSE owned its equipment, which it painted in its own colors, as the other sectors (and the PTEs in the other metropolitan areas) were doing. This made NSE a *de facto* vertically integrated system.

NSE was able to exert much greater control and accountability over both its operating budget and service quality than BR had been able to under its Regions. Relations were generally good between NSE and other sectors, although operating pressures sometimes forced staff to use equipment and other assets belonging to different sectors to meet immediate needs.

Franchises with Infrastructure Separation under Railtrack

Although many rail experts consider sectorization to have been a wise policy choice, Britain's central government replaced British Rail with a complex and much-debated combination of infrastructure separation and privatization in 1994. Tracks, signals, stations, and dispatching rights were sold to private monopoly owner Railtrack, and passenger cars were sold to three rolling stock leasing companies. BR passenger services were split into 25 franchises through competitive bidding overseen by the Strategic Rail Authority (SRA), formerly the Office of Passenger Railway Franchising.[11] Franchise holders, known as train operating companies (TOCs), must cover their costs from fares and whatever subsidies may be agreed in advance.

Bidders are allowed great flexibility in specifying the duration of the franchises they seek (anywhere from seven to twenty years), routes and schedules to be operated, payments to SRA (or the subsidy requested for unprofitable franchises), and investments to be made. This requires a flexible approach from SRA, as rival proposals are not entirely comparable with one another.[12] When one London commuter franchise came up for renewal in 2002, the incumbent operator proposed a frequent, inexpensive, no-frills service, while another bidder proposed new cars and a more amenity-oriented approach (aimed at a more affluent clientele).

Initially, franchise boundaries were based on BR's accounting service groups. In the London area, three separate TOCs might operate InterCity, regional "Express," and commuter services in one corridor. In an adjacent corridor, other TOCs might operate independently in broadly similar markets, sometimes serving the same stations. This was designed to promote competition and reduce the risk of widespread service disruption due to labor disputes.

Under NSE, lucrative direct expresses radiating from London helped subsidize operations on lightly-used branches, cross-regional lines, and local services. With the

[11] Richard D. Knowles, "Passenger rail privatization in Great Britain and its implications, especially for urban areas," *Journal of Transport Geography*, Vol. 6, No. 2, 1998.
[12] Peter R. White, "Impacts of rail privatization in Britain," *Transport Reviews*, Vol. 18, No. 2, 1998.

loss of cross-subsidies, commuter TOCs competing with both regional TOCs and express buses found it difficult to stay in the market. Yet in 2000, one stronger regional TOC received government subsidies three times the amount given to a weaker commuter TOC in an adjacent market, suggesting that contract prices are determined less by the route's true potential than by market distortions such as franchise availability at bidding time. Certain franchises were renegotiated after three or four years into "cost-plus" contracts when hard-pressed TOCs threatened to default on service obligations. Some observers argued that the franchises should be large enough for more profitable routes to cross-subsidize local services. Replacing a poorly-performing small TOC with another small company avoided the underlying problem that TOCs lacked the capital or market power to bargain with Railtrack for infrastructure capacity improvements, or demand improvements in railcar features as NSE did with its Networker cars.

Management structure and the carrier core functions became fragmented. Crewing was solely the responsibility of the TOC, but train scheduling was subject to a bid-and-approval process. TOCs requested train paths to provide a given level of service, but Railtrack had the power to resolve conflicting requests from different TOCs. Railtrack was firmly in charge of dispatching and traffic prioritization, but the TOCs were responsible for maintaining timed passenger connections and dealing with operational incidents (such as rolling stock failures or on-board emergencies).

This resulted in substantial duplication of functions, including separate scheduling departments and operations control centers for each TOC and Railtrack zone. Communications were not always smooth between these different departments. Furthermore, BR's breakup resulted in the loss of experienced service managers as TOCs competed to hire personnel who had formerly overseen larger service areas. Many managers retired because they felt that TOCs were no longer empowered to deliver train services effectively. One of the unintended consequences of the fragmentation of train operation functions was that Railtrack gained tremendous power to allocate track capacity.

The post-1994 arrangements created confusion among customers and officials as to who was in charge. An unprecedented series of accidents between 1996 and 2003 has been widely attributed to a lack of clear responsibility, the outsourcing of track maintenance to the lowest bidder, and a shortage of rail funding.[13]

Network Rail and Franchise Consolidation

In late 2001, the British government placed Railtrack in receivership,[14] replacing it with Network Rail, which is "effectively owned by the rail industry," not the former shareholders.[15] By aligning track ownership interests with the TOCs, officials improved track maintenance (which was brought back in-house) and operating safety. However, it has been necessary to raise fares and subsidies to finance safety improvements.

In 2000, when there was a run on franchises, SRA sought to minimize risk, emphasize experience, and encourage reliability. As initial seven-year franchises expired in the London region, SRA tried to realign franchises with time-tested boundaries of

[13] Murray Hughes, "Industry seeks ways out of a jungle of uncertainty," *Railway Gazette International*, September 2001.
[14] "Strategic Plan aims to restart investment," *Railway Gazette International*, February 2002.
[15] "Getting the network back on the rails," *Railway Gazette International*, December 2002.

railway operations. The former (pre-Grouping) Great Eastern Railway was effectively reconstituted by merging intercity and commuter franchises. Although Network Rail remains the infrastructure owner, the consolidated franchise was given *de facto* operating control of Liverpool St. Station, its London terminal. In Scotland, BR's Scottish Region was franchised as a single package, with apparently better operating results than several smaller franchises. A single regional TOC with a majority of train paths in an infrastructure management zone gives the TOC one point of contact with Network Rail, sidestepping the many-to-many coordination problems seen in other metropolitan areas with more TOCs and multiple infrastructure zones.

As public investment pours into Network Rail and franchises are realigned to create operating synergies, SRA has emerged as a powerful procurement department for Britain's passenger railways. In 2007, London Transport's successor Transport for London (TfL) became involved in commuter rail, taking over management of several inner suburban lines wholly within its area and incorporating them into TfL's fare system.[16] These lines are being marketed as the London Overground.

NORTHERN EUROPE: ALTERNATIVE APPROACHES TO INFRASTRUCTURE SEPARATION

Since 1993, the EU has mandated infrastructure separation for Europe's national railways, which historically owned tracks and operated trains throughout each country. Several countries, noting Britain's turbulent experience, have been reluctant to implement infrastructure separation. But the much-debated British experience is not the only template for unbundling railway assets and operations. Sweden, Germany, and the Netherlands are trying to implement infrastructure separation without the problems Britain has experienced.

Stockholm's regional transit system Storstockholms Lokaltrafik (SL) entered into a purchase-of-service contract with Statens Jarnvägar (Swedish State Railways – SJ) for commuter train operation starting in 1966. Since then, Stockholm's commuter trains have been marketed as part of the regional transit system. Further change started in 1988, when the government created Banverket, Sweden's nationalized track-owning agency, as a separate entity from SJ, which continued as the government-owned train operator.[17] Although SJ remains Sweden's intercity passenger rail operator, local authorities subsidizing trains were allowed to bid out those services.[18]

SL underwent change starting in 1991. Having followed a low-fare policy for two decades, the transit agency now faced the need to contain costs and improve efficiency, and chose to do so through competitive contracting administered through internal SL

[16] Jeremy Long, "London Overground: A charter for improvement," *Modern Railways*, February 2008.
[17] Chris Jackson, "Sweden's track authority sparks a quiet revolution," *Railway Gazette International*, April 1989.
[18] Bertil Hylén, "Franchised rail services in Sweden," *Public Transport International*, No. 1, 1997.

business units.[19] Bidding for bus operations started in 1993, a year later for metro lines, and in 1998, the SJ-operated commuter trains became subject to competitive bidding.[20]

SJ won the initial Stockholm commuter rail contract. Then in 2000 a new firm, Citypendeln AB, won the contract. One of the original participants in Citypendeln AB was a British train operating company, although the TOC later left the Stockholm market.[21] An SJ subsidiary, with a more competitive cost structure, won back the contract in 2006.

Public officials are trying to avoid the negative aspects of the British experience. Unlike the situation in Britain, the local transit authority SJ sets fares and schedules, and the railway infrastructure is well funded. Furthermore, under Sweden's ground rules for transportation privatization, the new employer is required to retain the employees from the previous company, with no reduction in pay.

Elsewhere in northern Europe, Germany is also approaching infrastructure separation with caution. Under a 2001 law, multiple operators were allowed in rail freight by 2003, but not in the passenger business, where Deutsche Bahn AG is dominant, until 2008.[22] In June 2008, the Rhine-Ruhr transit federation replaced Deutsche Bahn as its regional rail operator in response to alleged service deficiencies.[23]

In the Netherlands, where railways bring most of the country within commuting distance of Amsterdam, Rotterdam, and other cities, infrastructure separation has been blamed for a marked decline in service reliability starting in 2001.[24]

Norway and Switzerland are not EU members, and are thus not bound by EU requirements for infrastructure separation. Norway has adopted an infrastructure-separated regime comparable to Sweden's, but Swiss railway officials have made it clear that they intend to retain their vertically-integrated system. Perhaps the railways of Northern Europe will find ways to implement competition without fragmentation, based on the principle of maximizing value rather than minimizing price.

JAPAN: TRIUMPH OF VERTICAL INTEGRATION

In contrast to Europe, the Japanese approach to railway reorganization preserves vertical integration. Most of Japan's railways were nationalized under a 1906 law, although smaller lines were permitted to remain independent provided that there was physical separation between the rights of way. In suburban Tokyo, many private railways paralleled Japanese National Railways (JNR) lines and were able to compete for commuter traffic. Starting the mid-1960s, JNR began to suffer from problems similar to

[19] Bo Peterson, "Results from procurement of local and regional public transport services in the Stockholm region," *Public Transport International*, No. 1, 1998.
[20] Andrew Hellawell, "SJ seeks opportunities at home and abroad," *Railway Gazette International*, August 1998.
[21] Stig Larsson, "Separation can be made to work – with state support," *Railway Gazette International*, October 2001; also Bertil Hylén, "Deregulation of Passenger Rail Traffic in Western Europe," *Public Transport International*, No. 6, 2000.
[22] Hans Stuchly, "EBA wins wider regulatory powers," *Railway Gazette International*, November 2001.
[23] "DB sacked over S-Bahn quality failings," *Railway Gazette International*, July 2008.
[24] Maarten van Eeghen, "Netherlands restructuring: 'We need to find a more stable solution'." *Railway Gazette International*, January 2002.

those of other large nationalized railways, including loss of market share, rigid fare structure, slow pace of rationalization (both personnel and plant), poor employee relations, and bureaucratic management.

Against a background of mounting debts, and productivity at one-third the level of Japan's private railways, the government decided to restructure JNR in 1987.[25] The institutional boundaries under the new Japanese Railways (JR) group of companies reflect physical operations. JR was divided into six regionally-based, vertically-integrated passenger sectors and one freight operating company using trackage rights on the other companies' tracks. JR East and JR Central serve the Tokyo area. Private railways already operating in the busiest commuter corridors mitigated the threat of an inherent regional monopoly.

Beginning in the early 1970s, many of Japan's private railways embraced a diversification strategy with few parallels elsewhere in the world, extending the vertical integration concept well beyond railway operations. Railways have entered the real estate market, building large department stores and hotels at principal stations. The private railways have used this strategy to increase revenue, and JR companies were given freedom to pursue similar ventures to offset some of their operating costs. JR companies and private operators set their fares at levels only high enough to recover operating costs, as with Britain's former Network SouthEast, since it is widely recognized that the companies' retail divisions need rail service to compete with other business districts in Tokyo.[26] However, the local conditions permit a level of personnel and equipment utilization rarely paralleled elsewhere. Also, high-capacity services using purpose-built trains without seats running with crush loads on 2½-minute headways would seem unsustainable in markets where the automobile was a realistic option.

The government sold shares after each JR company became profitable, much as the US did with Conrail. The JR companies are thus able to plan on a long-term basis. Three JR sectors remain in government ownership and continue to receive subsidies, though at much lower levels than previously. The national government remains a minority shareholder in the privatized JR companies.

In suburban Tokyo, through running of equipment between several private railways and the municipal subway is common. Institutionally, this is considered as an exchange of cars between two vertically-integrated railroads, and involves separate train crews and the payment of per diem charges.[27]

AUSTRALIA: BUSINESS UNITS AND FRANCHISING

Australia's railways have traditionally been owned by state and federal governments, with three track gauges being used in different parts of the country. Commuter rail policies are formulated at the state level. Two state governments have chosen the

[25] Tatsujiro Ishikawa and Mitsuhide Imashiro, *The Privatisation of Japanese National Railways* (London, England: Athlone Press, 1998).
[26] Takahiko Saito, "Japanese private railway companies and their business diversification," *Japan Railway and Transport Review*, January 1997.
[27] S. David Phraner *et al.*, *Joint Operation of Light Rail Transit or Diesel Multiple Unit Vehicles with Railroads*. Transit Cooperative Research Program Report 52 (Washington, D.C.: Transportation Research Board, 1999).

business sector approach for their suburban railways. Sydney's commuter trains were formerly operated as an integral part of the State Rail Authority of New South Wales; now its business unit Cityrail provides service. Similarly, Citytrain, a business unit of Queensland Railways, operates commuter rail in Brisbane. Both of these are analogous to London's former Network SouthEast.

The greatest change for commuters has been in Melbourne, where all local rail services are privately operated under concessions. Historically, Melbourne's extensive electrified suburban rail lines were operated by Victorian Government Railways on a vertically-integrated basis. Subsequently, the Metropolitan Transit Authority (The Met) took over financial responsibility for transit in Greater Melbourne, including commuter rail. The Met and the State Transport Authority were merged in 1989 to form the Public Transport Corporation.

In 1999, the Public Transport Corporation (by then doing business as VicTrip) concessioned Melbourne's trams and commuter trains for 15 years.[28] There were initially two franchise holders for each mode – Bayside Trains and Hillside Trains for commuter rail, plus Swanston Trams and Yarra Trams for light rail. Within the first two years, a British TOC acquired Hillside Trains, and Bayside Trains and Swanston Trams were acquired by another British firm. But then,

> Three years after they were awarded by the state government of Victoria, all … [passenger] franchises in and around Melbourne had effectively collapsed by the end of August [2002]. The three operators … faced unsustainable losses if the 12 to 15-year contracts were to continue under the original terms. …
>
> Clearly, there can be no question of … allowing rail services in Melbourne to stop, and all … franchises are now being renegotiated on an interim basis…
>
> The most likely scenario would see retendering …on the basis of five-year franchises with the government having much firmer control of fares and service… [T]he break-up of the tram and suburban networks has merely produced inefficiency, so one franchise covering each reunified network is a likely outcome.[29]

Today, one operator runs all commuter trains, and another runs all light rail in Melbourne. The single commuter rail operator is able to more effectively coordinate service requirements with the infrastructure owner, avoiding some of the more negative aspects of the London experience.

ARGENTINA: COMMUTER FRANCHISES AND FREIGHT CONCESSIONS

Argentina's railways (mostly British-built) were designed primarily to bring the harvest of a rich agricultural plain to market for processing and onward shipment from Buenos Aires, the country's capital and commercial center. The railways – several of which had important Buenos Aires commuter services – served large geographic areas radiating from Buenos Aires (comparable to Great Britain during the Grouping era). What little competition there was within these zones came largely from meter and standard-gauge lines in what was otherwise 1,676 mm (5'6") gauge territory.

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[28] "Victoria leads in passenger sales," *Railway Gazette International*, November 1999, p. 729.
[29] "Victoria to renegotiate Melbourne contracts," *Railway Gazette International*, October 2002, p. 605.

The railways were profitable until the Depression, when economic nationalism became a major policy force in Argentina and government ownership was seen as an important tool for development. The federal government took over Argentina's financially faltering meter-gauge railways in 1938. The rest of the system, including the four major British-owned 1,676 mm (5'6") gauge railways, was nationalized as Ferrocarriles Argentinos (FA – Argentine Railways) in 1948, using most of Argentina's sterling reserves earned from food sales during World War II. Like British Rail, FA had operating regions based on its pre-nationalization predecessors.

From the mid-1950s through the early 1980s, Argentina went through a period of political turmoil. FA became notorious for overstaffing, inefficient service, and deferred maintenance, as successive administrations saw it as a source of jobs and contracts for supporters. No government seemed willing to modernize operating practices and restore the system to a state of good repair. On Buenos Aires' commuter lines, service was inadequate and unreliable, and fare evasion was rampant.

A new administration took office in 1989. Faced with a financial shortfall of crisis proportions, it decided to privatize most nationalized industries—including FA.

> There were two options: let the situation continue until FA collapsed, or do something drastic. …
>
> The Argentine suburban passenger system is among the larger systems in the world … Discontinuing passenger services in the Buenos Aires area would have meant road congestion and loss of the only available mode of transport for thousands of people.[30]

The government packaged FA to reflect the system's geography and distinguish between commuter and freight. Outside Greater Buenos Aires, the operating regions were put out to bid as freight franchises. In the metropolitan area, seven commuter rail operations were offered in 1992, and bids were awarded among four consortia. The concessionaires took over in 1994 and 1995, and major changes were soon evident:

> Improvements in cleanliness were particularly welcomed, as was a marked fall in the crime rate following the hiring of private police to guard trains and check fare evasion.
>
> … [P]assengers [were] surprised to find that trains were running consistently on time on some routes, and that they even had interior lighting at night.[31]

Concessioning attracted foreign capital to Argentina's railways for the first time since the 1920s. The administration understood that concessioning must adhere to the highest standards to attract investment. Consortia bidding for contracts were required to include a foreign rail transit operator or railroad with a proven record. For instance, Burlington Northern Santa Fe is a member of Metrovías, the rapid transit and standard gauge commuter concessionaire.

The commuter rail consortia requiring the lowest subsidies were chosen. One concession, including the rapid transit system and the sole standard gauge commuter line, was for twenty years with the option to renew for another ten years. Other franchises

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[30] Jorge H. Kogan and Louis S. Thompson, "Reshaping Argentina's Railways," *Japan Railway and Transport Review*, June 1994, p. 23.

[31] Enrique Garibotto, "Investment plus staff savings puts moribund network on track to profit," *Railway Gazette International*, May 1995, p. 295.

were for ten years, renewable for another ten. All franchises – commuter and freight – are for set lengths of time, and revert to the government unless re-concessioned. Concessionaires enjoy all of the control of a North American vertically-integrated railroad. Commuter rail concessionaires accommodate freight operators and occasional (subsidized) intercity passenger trains in much the same way that CSX, Canadian Pacific, and Amtrak use Metro-North's Hudson Line.

Between 1991 and 1998, commuter rail's share of all vehicular trips in greater Buenos Aires rose from 5% to 9% as growing traffic congestion made buses less attractive. Franchise renegotiations in 1997 extended the contracts to 30 years, and provided for greater investment from the concessionaires. This investment was to be funded from a fare increase, with all of the funds from the increase being dedicated to physical expansion and improvement of the system.[32] Some services were suspended in early 2002 in the wake of Argentina's economic crisis and currency devaluation, but a rescue package restored some stability. The government took over one failed commuter rail concession in 2004 and revoked two more concessions for poor performance in 2007.[33] A consortium of the three surviving concessionaires operates these services.[34]

BASIC IDEAS

There is great variety in the operating regimes for commuter rail, especially between North America and Europe. Yet closer examination suggests some basic ideas that could be used by future researchers to analyze the institutional organization of commuter rail.

Corridor-based versus Regional Franchises

On railroads and rail transit systems alike, disagreements often arise between infrastructure and train operating departments. When trackage rights or open access are involved, even more institutions need to coordinate with one another on track access and capacity allocation matters.

Under vertical integration, railroads tend to organize themselves into logical corridors. Coordination of operating arrangements and trackage rights can be difficult, especially where multiple railroads are involved (e.g., Virginia Railway Express). However, when commuter agencies provide strong oversight and reward on-time performance, vertically integrated railroads can provide good service because they are unambiguously in charge.

Commuter agencies worldwide have been quick to intervene and preserve service when financial hardship or wholesale reorganization of host railroads required action. Agencies have gained control of track access by purchasing assets or creating more accountable business units and management structures. By doing so, commuter agencies created regional franchises capable of protecting passengers' interests and allocating surplus capacity in a way that benefits the general railroad system. Private railroads have long taken a similar approach with union passenger stations (e.g., Washington) and

[32] José Barbero, "Success Stories – Buenos Aires," in *Reinventing Mass Transit: Moving into the Millennium, Selected Conference Papers* (Chicago: Regional Transportation Authority, 1999, p. 47).
[33] Enrique Garibotto, "Argentina sets a new course," *Railway Gazette International*, August 2007.
[34] Daniel Thomas, "Back to Scratch," *Latin Tracks*, September 2008.

terminal switching carriers (St. Louis). In other metropolitan areas, the opportunities for consolidation never arose, resulting in commuter services that continue to be organized into geographically-radiating corridors.

Decreasing Interfaces and Institutional Complexity

One way to analyze the institutional complexity of commuter districts is to count the number of infrastructure management zones and train operators in a given metropolitan area. Table 2 shows how the level of institutional complexity differs greatly among commuter rail systems. In London, the number of commuter rail and intercity passenger operators mushroomed under Britain's post-1994 organizational regime compared with the much more accountable arrangements under Network SouthEast.

In complex situations, many train operating units interact with multiple infrastructure management zones. This creates many interfaces between institutions that require coordination, especially when operating and infrastructure jurisdictions do not match. Vertical integration decreases these interfaces by internalizing them, in that cooperation between companies is only required for trackage rights or purchase of service agreements. Under open access, interzonal train operation can be minimized by adjusting infrastructure management zones.

If jurisdictional boundaries cannot be aligned, organizations with different interests and incentives must find ways to cooperate, or a gridlock situation may arise where no single institution is responsible for the network's fluidity. Thus, time-sensitive intermodal containers are sometimes trucked between the Chicago terminals of eastern and western railroads to avoid the critical zone where responsibility is fragmented for infrastructure and operations. Cross-regional passenger services may encounter similar problems in metropolitan areas with many corridor-based franchises. Aligning operating franchises with infrastructure zones minimizes the amount of coordination required because fewer trains follow routes that cross administrative boundaries.

Balance of Power Between Capacity Suppliers and Capacity Consumers

Consolidation brings market power. If there are more infrastructure zones relative to train operators (MBTA), if there is surplus capacity (Metra during the 1980s), or if infrastructure units are small (such as regional railroads), train operators can have market power. But a single errant infrastructure firm may still diminish network fluidity in the short term if it allocates capacity in a suboptimal manner. Conversely, if train operators are fragmented as in London, the relatively larger infrastructure steward has immense power and can make or break the performance of train operators.

Under European-style infrastructure separation, where the track company dispatches the network but may not operate trains, market power rather than dispatching is the key to consolidating control of track access. Typically, a commuter agency would arrange all services in a metropolitan area into one or two packages, to simplify contact between the train operators and the infrastructure steward. This facilitates high levels of cooperation and coordination even though the carrier core functions of dispatching and train crewing are nominally divided (e.g., London's Great Eastern franchise). Infrastructure companies are generally more responsive to operators representing a majority of train paths within a given management zone.

CONCLUSION

A worldwide paradigm shift has occurred in commuter rail organization since 1970. Formerly seen as an adjunct to larger systems dominated by intercity passengers or freight, commuter trains in such varied cities as Chicago, New York, Glasgow, Sydney, and Buenos Aires are now managed on a more regional basis than before.

Institutions seem to serve commuters best when a regional authority manages commuter rail – even under infrastructure separation. Conflicting demands for track use by commuter and other trains can be managed effectively through closer cooperation between different institutions. When commuter and other interests coincide, different organizations can cooperate well.

When capacity is insufficient to meet demand, problems may arise when infrastructure owners try to accommodate too much traffic. There is no substitute for increasing capacity when necessary.

As part of new railroad merger rules announced in 2001, the US Surface Transportation Board (STB) "included passenger carrier considerations in its regulations mandating that merger proposals include an extensive Service Assurance Plan." This was in response to requests from commuter rail authorities that the STB "give more weight to concerns that proposed mergers would interfere with their operations, which often run on freight rail-owned tracks."[35]

Changes in the organization of railways since the 1970s have affected commuters, either directly or indirectly. Systems throughout the world have largely settled on regional control of commuter rail. Policymakers should consider the needs of all stakeholders – commuters as well as shippers and intercity travelers – as they evaluate options and review the outcomes of different policies. Whatever options are selected in different countries, they should reflect a pragmatic search for what works best.

The views are those of the authors, and do not necessarily reflect the official policy of any organization. An earlier version of this paper was presented at the 88th Annual Meeting of the Transportation Research Board, Washington, DC, January 2009 as "Organizational Regimes for Commuter Rail: Improving Train Service Worldwide."

[35] "Make Room for Commuters," *Urban Transport News*, June 13, 2001, p. 89.

Table 1
Commuter Rail Organizational Regimes

Organizational Regime	Examples
Full vertical integration	North American freight railroads; Japanese passenger railways; Swiss Federal Railways
Agency-owned line with trackage rights granted to freight railroad	Metra Rock Island District
Purchase of service: railroad employees operate agency-owned trains	Metra commuter trains on BNSF and Union Pacific
Trackage rights agreements	NJ Transit and SEPTA on Amtrak's Northeast Corridor; South Shore Line on Metra Electric
Contractor running agency equipment on agency-owned tracks	MBTA North Station lines; Caltrain
Contractor running agency equipment on freight railroad tracks	SCRRA (MetroLink); MBTA Worcester Line; GO Transit on Canadian National lines
Agency-owned line dispatched by freight railroad retaining trackage rights	Metra Milwaukee District lines; South Florida RTA (Tri-Rail)
Semi-independent business units under common ownership	Sydney CityRail; British Rail between 1983 and 1994
Franchised operators controlling commuter lines under long term contracts providing trackage rights for other types of trains	Melbourne; Buenos Aires
Joint dispatching among users, one of which is the track owner	Amtrak (owner) and Long Island Rail Road (tenant) through East River tunnels to New York Penn Station
Joint ownership of major stations	Chicago Union Station before purchase by Amtrak
Nominal separation of track ownership and train operations, but under common ownership	France, Italy, Spain
Full infrastructure separation, sometimes with multiple train operators	Sweden, Germany, the Netherlands
Full infrastructure separation, with passenger services franchised to private operators	Former British Rail since 1994

Table 2
Institutional Complexity on Selected Commuter Rail Systems

Region; Franchise	Track Owners or Infrastructure Management Zones	Commuter Rail Operators	Intercity Passenger Train Operators	Rail Freight Operators	Operating Complexity
Boston; MBTA	4	1	2 (*A*)	2	Low
New York; MNR, LIRR and NJT	6	3	2 (*B*)	6	High
Chicago; Metra and NICTD	6 (*C*)	2	1	8	Medium
London; Network SouthEast (1986)	4	1 (*D*)	2 (*D*)	2 (*D*)	High
London; former NSE territory (1998)	4	14	9	3	Very High
London; former NSE territory (2008)	4	11	8	4	Very High
Melbourne; Connex	1	1	1	3	Medium
Buenos Aires; all commuter lines	7	4	2	5	Medium

Notes:
A – Amtrak's Northeast Corridor and the Amtrak-operated Downeaster service, which is managed by a multi-state consortium, are counted separately.
B – Includes Amtrak and Shore Line East, which interfaces with Metro-North in Connecticut.
C – Includes track-owning railroads plus Canadian Pacific, which dispatches Metra's Milwaukee District, but not Chicago SouthShore and South Bend, which owns (but does not dispatch) the Illinois portion of the South Shore Line.
D – British Rail's Network SouthEast was a commuter rail operator; InterCity ran intercity passenger trains, and Provincial operated both kinds of passenger service but is shown solely as an intercity passenger operator to avoid double counting. The Railfreight and Parcels sectors operated freight service.