

Organizational Regimes for Commuter Rail: Improving Train Service Worldwide

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Developments in the ownership and control of railroads affect commuter rail. Vertical integration and open access are widely seen as mutually exclusive options for rail reform. North American railroads were relieved of passenger service obligations and granted commercial freedom to improve profitability – all within the vertically integrated tradition. In Europe, infrastructure separation aims to encourage competition on traditionally monolithic and unprofitable government railways. Australia and Argentina have opted for business sectors and vertically-integrated operating concessions.

These differing policy initiatives have triggered remarkably similar responses by commuter rail authorities. Commuter rail is now managed with more local control than previously, with governments providing necessary operating support and infrastructure investment. Separation between commuter rail operators and control of rail infrastructure has generally increased, and greater institutional coordination is now required to deliver effective commuter service.

Regardless of national rail policy, commuter rail agencies can improve service by obtaining or retaining control of the carrier core functions. Under vertical integration, agencies may purchase control of rail infrastructure assets and invest in improvements as opportunities arise. Under open access, this must be accomplished by consolidating regionwide purchasing power for train paths to foster productive relationships with the infrastructure steward.

Commuter rail is becoming an increasingly important form of regional transit. Unlike other rail modes, it uses the general railroad system. Thus, overall rail industry developments affect commuter rail.

Since the 1970s, fiscal and political pressures have produced lasting changes in the institutional organization of railroads in much of the world. Railways have undergone bankruptcy, reorganization, mergers, sales of surplus lines, nationalization, corporatization, privatization, concessioning, and infrastructure separation. Governments addressing troubled railroads have selected various organizational regimes. Although policy initiatives differ, common trends exist:

- Commuter systems are generally managed with more local control than under prior monolithic ownership, with local authorities providing financial support, setting fare policy, dictating service standards, and requiring accounting transparency from service providers.
- With increasing local management, governments have been more willing to invest in fixed infrastructure to support commuter rail. In some cases, entire operating railroads were brought under public ownership; elsewhere, public investment has upgraded private railroads for commuter use.

North American and European models of railway organization have been compared, contrasted, debated, and evaluated for suitability in different locales (1, 2). This paper examines experiences from commuter systems under different organizational regimes. The choice of public versus private operation has affected financial and institutional outcomes, but this analysis focuses primarily on organizational complexity and its operating implications.

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 affecting commuter rail and general railroad operations. Transit agencies and advocates should work with lawmakers to ensure that overall rail policy safeguards commuters' needs. Also considered is how different functions might be organized within commuter railroads to minimize negative institutional impacts.

UNBUNDLING THE RAILROAD: ASSETS OR FUNCTIONS?

Traditionally, railway organization literature viewed operating railroads in asset-based terms:

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 (3).

This “unbundling” process, called infrastructure separation, is mandatory for national railways in the European Union (EU), and

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... (4)

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

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

Infrastructure Separation: A Matter of Degree

Since 1993, the EU has required national railways to adopt separate accounting for operations and infrastructure (Directive 91/440/EC), even if two companies held by the same 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. Phased regulations enforcing competition have weakened local authorities' control over rail infrastructure by regulating capacity allocation and train path pricing (2001/14/EC), enforcing non-discriminatory access for freight (2004/51/EC), and requiring open access for international passenger trains (2007/58/EC).

North American railroads were not unbundled through European-style infrastructure separation. Instead, commuter rail and intercity passenger train operations were disaggregated from freight within a vertically-integrated framework, using operating agreements and track sales. Taken together, the creation of Amtrak (Rail Passenger Service Act, 1970), streamlining abandonment processes (Regional Rail Reorganization Act, 1973), largely deregulating rail freight pricing and service (Staggers Act, 1980), and transferring commuter service from Conrail to transit agencies (Northeast Rail Service Act, 1981) have made US freight railroads more competitive. Via's formation (1978) and the National Transportation Act (1987) have similarly aided Canadian railways. However, some US shippers have advocated increased rail freight

economic regulation, and an administration has proposed infrastructure separation for the Northeast Corridor (5, 6).

Although vertical integration and infrastructure separation are often seen as absolute, the critical variable is the degree of separation between train operation (crewing and vehicle servicing) and capacity allocation (scheduling and dispatching). Table 1 shows the range of organizational regimes existing on commuter rail. North American carriers operating under trackage rights can have similar difficulties with dispatching as European open access carriers operating over infrastructure where they are not the dominant users. Conversely, locally market-dominant open access carriers can indirectly approximate similar levels of control over the infrastructure as vertically integrated railroads.

Internal Organization is Important

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

Vertical integration is seen as effective because traditional railroad organizational structures allow each department to be held accountable for its performance, and simplify interdepartmental coordination required to achieve effective operations control. Infrastructure-separated and/or concessioned service delivery regimes with clear lines of accountability can function as if the institutions formed a cohesive whole, although this is difficult to achieve in practice.

Where many vertically integrated carriers coexist in a metropolitan area through complex exchanges of trackage and other rights, fragmenting operations control mechanisms, coordination issues similar to those of open access networks may arise if institutions do not cooperate in good faith or if commuter and other interests are in direct conflict.

Commuter Rail and Control of the Carrier Core Functions

North American commuter railroads function best when they control 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 can be privately owned. Customers will be well served if commuter agencies retain strategic control, provide adequate oversight, and promote appropriate competition in service delivery contracts. Conversely, even with complete control under vertical integration, commuter railroads perform poorly when inadequately supervised.

Infrastructure separation can complicate commuter rail operations, because complete control over carrier core functions is not possible—particularly when multiple operators compete for limited capacity. There is no substitute for major infrastructure investment when demand outstrips capacity. Commuter rail agencies can approximate control of infrastructure through such strategies as:

- Consolidating operations to become a major train path purchaser in a corridor or metropolitan area.
- Aligning infrastructure management zones along logical corridors or commuter districts, minimizing the number of trains crossing management zone boundaries.
- In high traffic density areas, upgrading infrastructure to cushion commuter service from external operating perturbations.
- Providing performance incentives to track-dispatching firms through bonus payments and/or penalties.

Where commuter services operate under trackage rights or purchase of service contracts, or own tracks but lack dispatching rights, they resemble infrastructure-separated operations in that indirect methods are necessary to achieve good performance, and commuter agencies need excellent relations with track owners.

Although yesteryear's full-service railroads providing commuter, intercity passenger, and freight service make sense operationally, modern political and financial circumstances demand more transparent cost allocation. This can be accomplished with either vertical integration or infrastructure separation. Each has its distinct advantages and disadvantages (7). Under vertical integration, promising commuter rail corridors might remain undeveloped if host railroads hesitate in granting trackage rights or restrict available train paths. Under open access, service management can become highly complicated.

As a pragmatic matter, where circumstances permit, commuter rail agencies should purchase or lease control of all carrier core functions on the lines they use – and be wary of open access proposals which necessarily weaken their control (8). Even if the functions are franchised back to former owners, the threat of revocation may help 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 track capacity, they should allow other trains use these routes responsibly so society gains maximum benefits from the rail network. Under vertical integration, host railroads increase their franchises' value by partnering with other operators to attract investment capital and trackage fees, much like infrastructure companies under infrastructure separation.

NORTH AMERICA: VERTICAL INTEGRATION AND OPERATING AGREEMENTS

Vertical integration has shaped commuter systems in North America, where track owners operate trains and normally dispatch their lines. Often, host railroads allow others to operate over their lines through agreements negotiated for mutual advantage, inherited from former owners, or mandated to preserve competition under mergers and acquisitions (9). Aside from Amtrak, no carrier has automatic rights to use another railroad's tracks.

Until the 1970s, North America's freight railroads also operated commuter and intercity passenger trains, receiving subsidies only in certain northeastern US jurisdictions. Since the mid-1970s, commuter carriers have acquired some lines, and

agreements allowing commuter agency trains to use Amtrak or freight railroad tracks are common. These commuter rail properties now operate under arrangements differing from line to line and even along certain lines.

Variety of Agreements

Under *purchase of service contracts*, commuter agencies pay host railroads to operate agreed-upon schedules, with hosts (Amtrak or freight railroads) providing operating crews. Examples include Metra's BNSF and Union Pacific lines in Chicago, and MARC in the Washington-Baltimore area. There are 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 Stouffville line, Canadian Pacific continues to provide crews).

Under *trackage rights agreements*, agencies pay for operating rights on host railroad tracks using agency equipment and employees (who must be fully qualified on host lines). Examples include Metra's South West and North Central Services in Chicago, and New Jersey Transit (NJT) and Southeastern Pennsylvania Transportation Authority (SEPTA) on Amtrak's Northeast Corridor.

Since the Metropolitan Commuter Transportation Authority's 1966 acquisition of the Long Island Rail Road (LIRR), several agencies have purchased lines outright. Typically, agencies operate trains with their own employees (though others use contractors). Specifics vary, but freight railroads usually retain "perpetual and exclusive" trackage rights. Examples include Boston's North Station lines, and several lines in New Jersey and Philadelphia.

Freight railroads dispatch some agency-owned tracks. The Milwaukee Road's successor Canadian Pacific dispatches Chicago's two Metra-owned Milwaukee District lines, as the sale of the track did not include dispatching rights. Similarly, GO Transit owns the approaches and tracks through Toronto Union Station, but Canadian National continues to dispatch this segment.

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

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 commuter agency-owned lines. Sometimes, commuter agencies serve similarly long routes themselves (LIRR Montauk Branch, NICTD South Shore Line).

Safeguarding Commuters' Interests Through Operating Control

In North America, agency control of operations best protects commuters' interests. Commuter agencies have purchased operating railroads (LIRR), created new railroads after purchasing lines (Metro-North, portions of Metra), and even bought infrastructure and operating control while contracting out operations to former owners (Massachusetts Bay Transportation Authority [MBTA] in the Boston & Maine era).

Where agencies lack complete control over carrier core functions like dispatching, obtaining cooperation from companies controlling key operating functions may require further incentives. Some freight railroads have responded positively to contracts providing bonus payments for good on-time performance, but these incentives may be insufficient where track capacity is scarce.

Commuter rail authorities often invest heavily in tracks and facilities. Agencies have rebuilt dilapidated lines, rehabilitated secondary lines, restored or extended service, built new downtown stations and tunnels, and added track capacity for commuter trains.

In Massachusetts, Connecticut, New York, and New Jersey, states have become *de facto* owners of commuter lines. Yet these states have been proactive in developing freight and Amtrak services, inviting new operators through trackage rights or franchises. On the Northeast Corridor, Massachusetts considers Amtrak's intercity service so important that it allows Amtrak to dispatch the entire state-owned line between Boston and Rhode Island. In Connecticut and New York, however, Metro-North retains dispatching control. LIRR concessioned its freight operations to the New York & Atlantic Railway for 20 years in 1997, scheduling freight trains during off-peak hours. MBTA also franchised freight operations on its Old Colony lines.

Chicago and New York are seeking greater cooperation in commuter-intensive territory. To better manage their interrelated Chicago area operations, major freight railroads created the Chicago Transportation Coordination Office. Supervisors from all member railroads are on hand at Metra's dispatching center, chosen because freight railroads see Metra as impartial. "Metra delays due to freight interference have decreased by 50% since the [clearinghouse's] inception" (10). In New York, Amtrak and LIRR share dispatching control of 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 other users' needs. But where intercity and commuter services compete for limited capacity (Amtrak on Metro-North's New Haven Line; other commuter railroads on Amtrak lines), owners may give their trains priority. These concerns led NJT to proceed with its own Mass Transit Tunnel to New York.

In 2001, the US Surface Transportation Board (STB) announced new rules for major railroad mergers that require an extensive Service Assurance Plan. This was in response to commuter rail authority requests that the STB "give more weight to concerns that proposed mergers would interfere with their operations, which often run on freight rail-owned tracks" (11).

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 the government-led Grouping process merged these railways into four large vertically-integrated, geographically-based systems. With railway nationalization in 1948, British Rail (BR) took over the “Big Four” 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 regions, along with a Scottish Region added after nationalization, also operated commuter services in “Provincial” cities outside London.

In the early 1970s, local governments in Provincial cities like Glasgow, Manchester, Liverpool, and Birmingham formed transit authorities termed Passenger Transport Executives (PTEs). Although the PTEs’ core business was bus service, they also obtained additional commuter rail service through purchase-of-service contracts and made capital grants for replacement cars as equipment aged. As in North America, the new cars were generally owned by the regional agencies, and painted to reflect their ownership.

In London and adjacent “Home Counties” – densely populated, affluent, prime commuter rail territory – BR’s Regions operated autonomously until the mid-1980s. The central government retained control of London’s operationally (and politically) complex commuter trains. Although London Transport (now Transport for London) has extensive bus and rapid transit service within the Greater London Area, many commuter lines extended further, sometimes 60 miles (100 km) or more from the city center.

British Rail Sectorization and Network SouthEast

Beginning in 1983, BR’s 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. The Regions were retained for infrastructure management purposes.

This structure, called sectorization, sought to increase budgetary efficiency and managerial accountability, instead of privatizing BR outright. Although BR owned all five sectors, each sector was assigned 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 (12).

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 had to cover most operating costs from revenues (13). Not all London commuter traffic was profitable, but NSE charged other BR Sectors trackage fees, and used more profitable commuter and express flows to cross-subsidize socially necessary services. As before, the central government remained NSE’s source of capital funding.

Although NSE did not own or maintain infrastructure, it controlled almost all carrier core functions. NSE set its own goals and service standards in consultation with

BR, and created its own oversight and management structure. BR let NSE 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 other sectors were doing. NSE was a *de facto* vertically integrated system.

NSE exerted much greater control and accountability over both its operating budget and service quality than BR's Regions could. Relations were generally good between NSE and other sectors, although operating pressures sometimes forced staff to use equipment and assets belonging to other sectors to meet immediate needs.

Franchises with Infrastructure Separation under Railtrack

Although many rail experts considered sectorization a wise policy choice, starting in 1994 Britain's central government went well beyond EU-mandated changes, replacing British Rail with a complex and much-debated combination of infrastructure separation and privatization. Tracks, signals, stations, and dispatching were sold to private monopoly owner Railtrack, and passenger cars to three rolling stock leasing companies (ROSCOs). BR passenger services were split into 25 franchises through competitive bidding overseen by the Office of Passenger Railway Franchising (OPRAF), now the Strategic Rail Authority (SRA) (14). Franchise-holding train operating companies (TOCs) must cover their costs from fares and any subsidies agreed in advance.

Bidders were allowed great flexibility in specifying franchise length (anywhere from seven to twenty years), routes and schedules, payments to OPRAF (or subsidies requested), and capital investments to be made. This required a flexible approach from OPRAF, as rival proposals were not entirely comparable (15). 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 lightly-used branches, cross-regional lines, and local services. Without cross-subsidies, commuter TOCs competing with regional TOCs and express buses found it difficult to stay in business. 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 routes' true potentials than by market distortions like 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 poorly-performing small TOCs with other small companies avoided the underlying problem that TOCs lacked capital and 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 carrier core functions became fragmented. Crewing was solely the TOCs' responsibility, but train scheduling required bid-and-approval processes. TOCs requested train paths to provide desired service, but Railtrack had the power to resolve conflicting requests from different TOCs. Railtrack was firmly in charge of dispatching and prioritizing trains, but TOCs were responsible for maintaining timed connections and dealing with operating incidents like equipment failures, on-board emergencies, etc.

Many functions were duplicated, requiring separate scheduling departments and operations control centers for each TOC and Railtrack zone. Communications were not always smooth between these different organizations. Furthermore, BR's breakup caused shortages of experienced service managers, as TOCs competed to hire personnel who had formerly overseen larger service areas. Many managers retired because they felt TOCs were not empowered to deliver train services effectively. One unintended consequence of this institutional fragmentation was that Railtrack gained tremendous power to allocate track capacity.

The post-1994 arrangements generated confusion among customers and officials as to who was in charge, and created economic incentives causing newly-disjointed actors to work at cross purposes. Although meant to bring private capital into Britain's railways, the highly competitive structure gave ROSCOs little incentive to invest in new equipment specific to particular TOCs, hindering innovation as proven equipment and "lowest common denominator" designs became the *de facto* standard. Railtrack preferred "asset life extensions" over capital enhancements unless increased train path sales could be guaranteed. An unprecedented series of accidents between 1996 and 2003 was widely attributed to a lack of clear responsibility, low-bid track maintenance outsourcing, and rail funding shortages (16).

Network Rail and Franchise Consolidation

In late 2001, the British government placed a financially-troubled Railtrack in receivership, replacing it with Network Rail, which is "effectively owned by the rail industry," not the former shareholders (17, 18). By aligning track ownership interests with the TOCs, officials improved track maintenance (largely brought back in-house) and operating safety. However, fare and subsidy increases were needed to finance safety improvements.

During the "run on franchises" in the late 1990s, OPRAF minimized risk, emphasized experience, and encouraged reliability (19). As initial seven-year franchises expired, successor SRA tried to realign franchises with time-tested boundaries of railway operations. The former (pre-Grouping) Great Eastern Railway was effectively reconstituted by merging commuter and intercity franchises. The consolidated franchise was given *de facto* operating control of its London terminal (Liverpool St. Station), although Network Rail remains the infrastructure owner. In Scotland, BR's Scottish Region was initially franchised as a whole package, with apparently better operating results. Single regionwide TOCs, with most train paths in their infrastructure

management zones, have one point of contact with Network Rail, avoiding coordination problems seen in regions where many TOCs work with multiple infrastructure zones.

As public investment poured into Network Rail and franchises were realigned to create operating synergies, SRA emerged as a powerful procurement department for Britain's passenger railways. In 2007, Transport for London (TfL) became involved in commuter rail, taking over management of several inner suburban lines wholly within its area, incorporating them into TfL's fare system, and marketing them as London Overground (20).

AUSTRALIA: BUSINESS UNITS AND FRANCHISING

Australia's railways were traditionally owned by state and federal governments, with three track gauges in different areas. States independently formulate commuter rail policies. Two states chose business sectors for suburban services, comparable to London's former Network SouthEast. Sydney's commuter trains were formerly operated integrally with the State Rail Authority of New South Wales; now its business unit Cityrail provides service. Similarly, Citytrain, a Queensland Railways business unit, operates commuter rail in Brisbane.

Melbourne, where all local rail services are concessioned, has had the greatest change. Historically, Victorian Government Railways operated Melbourne's extensive electrified suburban service. In 1983, the Metropolitan Transit Authority (The Met) assumed overall (and financial) responsibility for regional transit. 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. Initially, two franchises were let for each mode – Bayside Trains and Hillside Trains for commuter rail, plus Swanston Trams and Yarra Trams for streetcars. Within 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 ... continue[d] 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 ...

The most likely scenario would see retendering ...[for] 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 (21).

Today, one operator runs all commuter trains, and another runs all streetcars. The commuter rail operator can effectively coordinate service requirements with the infrastructure owner, avoiding Britain's difficult fragmented experience.

ARGENTINA: COMMUTER FRANCHISES AND FREIGHT CONCESSIONS

Argentina's railways (mostly British-built) were designed primarily to bring agricultural harvests to market for processing and export from Buenos Aires, the country's capital and commercial center. Railways served large areas radiating from Buenos Aires (comparable to Great Britain during the Grouping era), and had intensive commuter operations. Incidental competition occurred between railways where meter and standard-gauge lines served predominantly 5'6" (1,676 mm) gauge territory.

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 development tool. The federal government took over Argentina's financially faltering meter-gauge railways in 1938. The remainder, including the four major British-owned 5'6" (1,676 mm) gauge railways, was nationalized as Ferrocarriles Argentinos (FA – Argentine Railways) in 1948, using most of Argentina's sterling reserves earned from World War II food sales. Like British Rail, FA had operating regions based on its pre-nationalization predecessors.

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

Faced with a major financial crisis, a new administration taking office in 1989 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. (22).

FA was packaged to reflect system geography and distinguish between commuter and freight. Outside Buenos Aires, operating regions became independent freight carriers. In the metropolitan area, seven commuter rail franchises were offered in 1992, and bids were awarded among four consortia. The concessionaires took over in 1994-1995, soon resulting in major changes:

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 (23).

Concessioning attracted foreign capital to Argentina's railways for the first time since the 1920s. The administration understood that to attract investment, concessioning must adhere to the highest standards. Potential franchisees were required to include a foreign rail transit operator or railroad with a proven record. For instance, BNSF Railway is a member of the broad-gauge concessionaire Trenes de Buenos Aires.

Franchises were awarded to minimize costs and avoid geographic dominance. One concession, including rapid transit system and the sole standard gauge commuter line, was for twenty years with a ten-year renewal option. Other franchises were for ten years, renewable for another ten. All franchises – commuter and freight – were for set lengths, reverting to the government unless re-concessioned.

Concessionaires enjoy all the control of vertically-integrated railroads. Commuter concessionaires accommodate freight operators and occasional (subsidized) intercity passenger trains such as Metro-North's Hudson Line accommodates CSX, Canadian Pacific, and Amtrak.

Between 1991 and 1998, commuter rail's share of motorized trips in Buenos Aires rose from 5% to 9% as growing traffic congestion made buses less attractive. Renegotiations in 1997 extended franchises to 30 years, and provided for greater concessionaire investment, funded from fare increases dedicated to improvement and expansion (24). Argentina's 2002 economic crisis caused some service suspensions, but a rescue package restored stability. The government took over one failed commuter rail concession in 2004 and revoked two more for poor performance in 2007. Three surviving concessionaires jointly operate these services (25).

JAPAN: TRIUMPH OF VERTICAL INTEGRATION

Japan's railway reorganization preserved vertical integration. In suburban Tokyo, many private railways paralleled Japanese National Railways (JNR) lines and competed for commuter traffic. Since the 1960s, JNR suffered from problems similar to other nationalized railways, including ridership losses, high fares, problematic employee relations, and resistance to modernization of traditional rail lines.

JNR was privatized in 1987 into six vertically-integrated regional passenger railroads and one trackage-rights freight carrier (26). Together with through-running subways and private railroads, Japan Railways group companies JR East and JR Central serve Tokyo's commuters. Privatization restructured unsustainable capital debt, stabilized fares, increased productivity, and permitted real estate development that generated additional revenues.

BASIC IDEAS

Closer examination suggests some helpful ideas for analyzing commuter rail institutional organization. On railroads and rail transit systems alike, disagreements often arise between infrastructure and operating departments. Where trackage rights or open access regulations apply, track access and capacity allocation involve additional institutions.

Corridor-Based Versus Regional Franchises

Vertically integrated railroads tend to organize themselves into logical corridors. Coordinating operating arrangements and trackage rights can be difficult for commuter agencies, especially where multiple railroads are involved (e.g., Virginia Railway Express). However, when agencies provide strong oversight and reward on-time

performance, vertically integrated railroads can provide good service because they are unambiguously in charge.

Transportation agencies worldwide have moved decisively to preserve service when host railroads' financial hardship or wholesale reorganization required action. Agencies gained control of track access by purchasing assets or creating more accountable business units and management structures. Agencies thus created regional franchises capable of protecting passengers' interests and allocating surplus capacity to benefit the general railroad system. Private railroads have long taken similar approaches with union passenger stations and terminal switching carriers. In metropolitan areas with limited consolidation opportunities, commuter services 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 greatly institutional complexity varies among commuter systems. In London, the number of commuter rail and intercity passenger operators mushroomed under Britain's post-1994 organizational regime compared with Network SouthEast's much more accountable arrangements.

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, so 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 ownership and service responsibilities are fragmented. 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 cross administrative boundaries.

Balance of Power Between Capacity Suppliers and Consumers

Consolidation brings market power. If surplus capacity exists (1980s Chicago), large commuter agencies deal with several infrastructure owners (MBTA), or infrastructure units are small (regional railroads), train operators can have market power. But even one errant infrastructure firm can still diminish network fluidity. Conversely, if train operators are fragmented (London), the relatively larger infrastructure stewards have immense power and can make or break train operators' performance.

Under European-style infrastructure separation, where track companies dispatch networks but are prohibited from operating trains, market power rather than dispatching is key for controlling track access. Typically, commuter agencies arrange all services in their metropolitan areas into one or two packages, to simplify contacts between train operators and infrastructure stewards, facilitating 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 responsive to operators representing a majority of train paths within a given management zone.

Tradeoffs in Organizational Regimes

Designing effective organizational regimes involve complex tradeoffs, as Figure 1 shows. In Chicago, Metra partners with various railroads (Figure 1, upper end), although this alone does not explain Metra's good relationships with host railroads. British railways have many operators and infrastructure zones. Since 2001, train operators have jointly controlled track owner Network Rail, but institutional interfaces remain complex and highly fragmented (Figure 1, right). In Continental Europe, deregulation has created many operators, but monolithic former national railways remain powerful, regulated only by EU legislation (lower end). Despite privatization, concessioning, or even open access, commuter railways in Tokyo, Melbourne, Glasgow, (and increasingly Boston, less so Buenos Aires) remain large monoliths empowered to deliver effective train services within their jurisdictions (left). In New York, Philadelphia, and Taipei, commuter railroads retain traditional vertical integration (far left).

British policymakers sought to reduce labor's power to press wage demands or engage in widespread job actions, and indeed unions now have somewhat less bargaining power. Unexpectedly, infrastructure separation and franchising also weakened and fragmented management, hindering service delivery. Nationalized or monolithic railways can have inefficiencies, but one single infrastructure steward can help one "Traffic Department" more readily than it can multiple competing operators.

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.

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 passengers – 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.

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The views are those of the authors, and do not necessarily reflect official policy of any organization.

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Figure 1. Power Relationships Under Different Organizational Regimes

TABLE 1 Commuter Rail Organizational Regimes

<u>Organizational Regime</u>	<u>Examples</u>
Full vertical integration	North American freight railroads; Japanese passenger railways; Swiss Federal Railways; Taiwan Railway Administration
Agency-owned line with trackage rights granted to freight railroad	Metra Rock Island District; Long Island Rail Road; MBTA Old Colony lines
Agency-owned line dispatched by freight railroad retaining trackage rights	Metra Milwaukee District; South Florida RTA (Tri-Rail); Toronto Union Station
Trackage rights agreements	NJ Transit and SEPTA on Amtrak's Northeast Corridor; South Shore Line on Metra Electric
Amtrak trains running on commuter agency-owned lines	Metro-North New Haven and Hudson Lines (Northeast Corridor and Empire Service); MBTA (Downeaster Service); Metra Milwaukee District (Hiawatha Service)
Purchase of service: employees of host railroad operate agency-owned trains	Metra commuter trains on BNSF and Union Pacific; MARC Camden, Brunswick Lines; GO Transit (CP)
Purchase of service: Amtrak employees operate agency-owned trains on Amtrak lines	Shore Line East; MARC Penn Line
Contractor running agency equipment on agency-owned tracks	MBTA North Side lines; Caltrain; GO Transit (CN)
Contractor running agency equipment on freight railroad tracks	SCRRA (MetroLink); MBTA Worcester Line; GO Transit on Canadian National lines
Semi-independent business units under common ownership	British Rail between 1983 and 1994; Sydney CityRail; Brisbane Citytrain
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

<u>Region; Franchise</u>	<u>Track Owners or Infrastructure Management Zones</u>	<u>Commuter Rail Operators</u>	<u>Intercity Passenger Train Operators</u>	<u>Rail Freight Operators</u>	<u>Operating Complexity</u>
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	2	2	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 commuter lines	7	4	2	5	Medium
Tokyo commuter lines	4 (D)	4 (D)	2	1	High

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 – Tokyo’s multiple private railways are counted as a single operator and infrastructure zone.

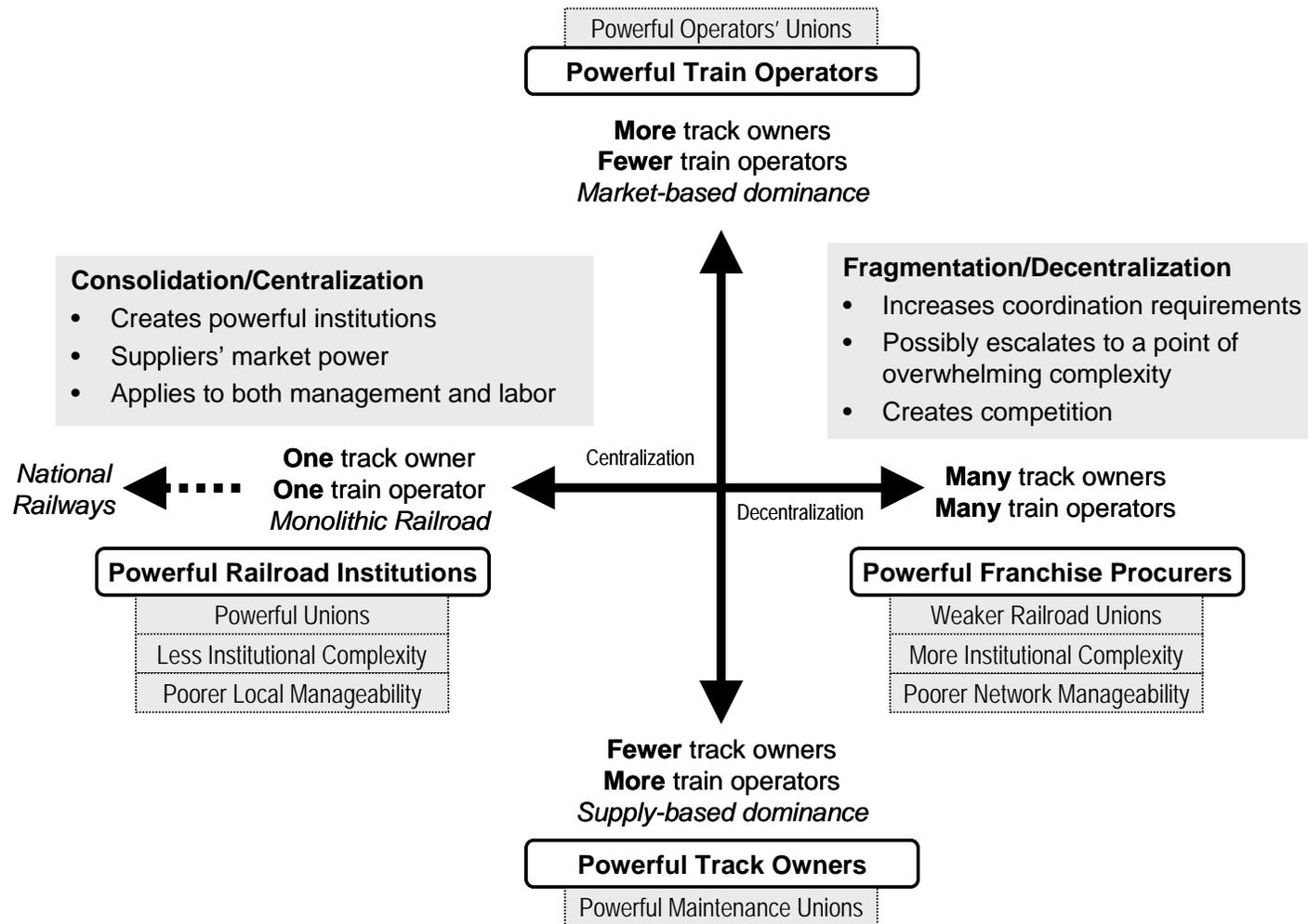


FIGURE 1 Power Relationships Under Different Organizational Regimes