

NETWORK ISSUES IN FREIGHT RAILROADS

John Kwoka
Northeastern University
j.kwoka@neu.edu

Lawrence J. White
Stern School of Business
New York University
lwhite@stern.nyu.edu

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I. INTRODUCTION

Railroads are among the earliest examples of a network industry in the U.S. economy. From its origin in the mid-1800s, freight rail service¹ has involved the collection of shipments from scattered locations, their aggregation into multi-car trains at centrally located terminals, their dispatch over trunk lines to other terminals, and finally their distribution to final destinations. A stylized picture of a rail transport network is shown in Figure 1. Points A, B, and C represent points of origin, from which shipments are aggregated at a terminal or yard (denoted T1), then move to a second terminal T2, from which they are distributed to final destinations X, Y, and Z.

This production process involves two types of physical facilities. "Below the wheel" are the rights of way, trackage, switches, etc.--inputs with high fixed and sunk costs. "Above the wheel" inputs are the locomotives and cars (the "rolling stock"), also characterized by high fixed costs but not generally sunk with respect to a particular route or shipment. Despite these cost considerations, until recently railroads have been characterized by a significant number of carriers and competition. In some places this was due to shipment densities that were sufficiently high to support multiple trunk lines. Elsewhere it was due to aggressive competition for the business of specific high-volume

¹ Passenger rail service in the U.S. is also a network industry, but since Amtrak is presently the sole provider, no competitive access issues arise. Implications of proposed changes in Amtrak's structure are discussed below.

shippers. For much of the 1900s, it was also due to regulatory impediments to the abandonment of unprofitable lines. And throughout, railroads increasingly had to compete with truck and barge transportation for some types of business.

Also common were railroad mergers, which reduced the number of large ("Class I") railroads from 186 in 1920 to 39 by 1980. In the latter year the Staggers Act was passed, substantially deregulating railroads and granting them wide pricing discretion. The Interstate Commerce Commission (ICC) continued to approve mergers, leaving just eleven Class I railroads by 1995, with but four major railroads in the east and three in the west. The service effects of the round of mergers in the mid-1990s -- especially, the Union Pacific (UP) and the Southern Pacific (SP) merger that was approved in 1996 by the ICC's successor, the Surface Transportation Board (STB) -- were so adverse (Kwoka and White, 1999) that the STB imposed a moratorium on mergers, issued new guidelines, and promised to scrutinize future consolidations more critically.² Observers nonetheless think it inevitable that the two remaining east coast carriers and the two remaining west coast railroads will pair off, creating two coast-to-coast rail freight systems.

II. THE ISSUES

Throughout its history, freight rail service has raised issues of network access and competition. Three of these deserve mention--compatibility, terminals, and interline competition.

Fifty years after the initial development of the U.S. rail system, different track gauges were still employed. The single most common was the English "standard gauge" of 4 feet, 8.5 inches, which was widespread in the North but accounted for only about half of all track in the country. A wider gauge prevailed in the South, while the Mountain states employed a narrower gauge. Shipments into or out of these regions required either breakdown and reloading ("break bulk"), use

² Many questioned the STB merger guidelines and doubted the determination of the STB to enforce sound antitrust standards. See, for example, Kwoka and White (2000).

of car hoists that shifted cars onto different gauge carriages, variable tread rail cars, or three-rail lines. Each of these alternatives had disadvantages, and collectively this system fragmented rail transport and protected regional carriers from incursions by rivals.

In the 1880s under the impetus of westward expansion the three major Midwestern railroads decided to switch to the standard gauge, followed soon by most of the southern railroads.³ At that point it was said that standardization had made Southern railroads "truly...part of the national network. An immediate dividend [was] increased efficiency [from] more extensive car interchange...among the railroad companies" (Stover, 1961). Apparently, with no dominant railroad, each found private cost savings more advantageous than the strategic benefit of excluding a competitor, though the details of the process by which this agreement was struck remain unclear.

Clearer competitive concerns were raised by various consolidations and inter-corporate agreements at the turn of the century. The most famous of these was the Terminal Railroad Association, which controlled the sole rail bridge across the Mississippi at St. Louis, as well as switching yards on both sides of the river. This was purchased by Jay Gould and owners of fourteen railroads, a group that did not include all railroads transiting St. Louis. To the extent that the latter were granted access to the terminal facilities at all, such access was said to be at discriminatory rates. Given the economic infeasibility of any other river crossing, the Supreme Court held that Terminal Railroad controlled an "essential facility" and required that non-members be given the right to buy an ownership interest or, alternatively, provided with access to the facilities on fair terms.⁴

³ One of them -- the Illinois Central -- deployed 3,000 workers to shift all 550 miles of its line south of Cairo to the narrower gauge between dawn and 3 pm on a single day in July, 1881. Several southern railroads in concert shifted 13,000 miles of track in two days in 1886. See Stover (1961) and Shapiro and Varian (1999).

⁴ See U.S. v. Terminal Railroad Association of St. Louis, 224 U.S. 383 (1912).

Foreclosure and related issues have arisen frequently in the context of competition between single-line and interline railroads. This circumstance—depicted in Figure 2--arises when an entire route O-D is served by one railroad (the single line firm), with one portion (O-T) also served by a second carrier. The latter must therefore "interline" at point T, transferring its shipment to the single-line carrier to complete the movement and thereby compete for the O-D business. The single-line carrier can blunt or eliminate competition by denying the O-T rival access or discriminating in the price charged for the T-D movement (a "price squeeze"). These circumstances became more frequent with the proliferation of end-to-end mergers during the 1970s and 1980s -- that is, mergers in which one of two railroads serving the O-T segment merged with the sole T-D railroad, creating a single-line O-D carrier that still faced a competitor on the O-T segment (White, 1999).

Casting this as a simple issue of vertical pricing, relying upon the Chicago School proposition that the monopoly firm can extract all profit from the bottleneck T-D segment, and ignoring the protests of shippers, the ICC concluded that such mergers could not cause incremental market distortion. Any distortion was due to the pre-existing T-D monopoly, and since there were generally efficiency benefits from single-line service to shippers, the ICC approved a wave of such mergers. Empirical evidence, however, has established that interline competition does constrain pricing (Grimm et al, 1990; Grimm and Winston, 1992). Likely reasons include standard pricing practices that do not entail prior full extraction of profit from T-D, greater opportunity for secret contracting in the presence of an interline rival, and the threat of more comprehensive entry. The implication is that discriminatory access or outright foreclosure of the interline competitor in the scenario described in Figure 2 has significant economic consequences.

III. ACCESS ARRANGEMENTS

There are, in principle and in practice, only a few ways of dealing with access:

- Free market "neglect" (with the hope of entry);
- Regulated rates/tariffs for the sale/purchase of access services;
- The entrant "rents" the access facilities from the bottleneck carrier;
- The firms reciprocally cooperate (voluntarily), when each wants/needs access to the other's bottleneck facilities;
- Joint ownership of bottleneck facilities;
- Mandated divestiture of duplicative facilities; and
- Vertical separation.

We will address each remedy, in turn.

A. Free market neglect.

One possible response to bottleneck access problems is to neglect or ignore them. This has been the response of the ICC/STB for the past two decades. In some instances this neglect is not serious, because potential entry is a sufficient threat so as to temper the exercise of market power that could otherwise be exercised by the bottleneck carrier. Such tempering occurs when a shipper's location is sufficiently close to another rail carrier's facilities that the threat of building a rail extension to those facilities is a realistic one.⁵

In the absence of such realistic threats, however, the neglect of the access problem clearly yields market power for the bottleneck carrier.⁶

B. Regulated rates for access.

⁵ Such extensions are sometimes described as a "build out" or a "build in", depending on who constructs and owns the extension.

⁶ Further analysis can be found in Tye (1986) and McFarland (1987) . The STB's decision in Central Power & Light v. Southern Pac. Transp. Co., 1 S.T.B. 1059 (1996) and 2 S.T.B. 235 (1997), reflects the agency's general unwillingness to intervene where there are (from shippers' or recipients' perspectives) existing access problems.

This has been the traditional response to bottleneck problems in many network industries, such as rail, telephone, and electricity; such regulation has receded, especially in rail, over the past two decades. The rate regulation, in principle, recognizes the exercise of market power that would otherwise occur and tries to establish rates that would be consistent with a more competitive structure. The actual setting of rates, however, is itself bedeviled with difficult conceptual and factual issues, as well as being subject to political forces.⁷ And misguided rate regulation can end up being as distortionary (or more so) as unregulated monopoly bottleneck control over access.

C. The entrant "rents" access facilities from the bottleneck carrier.

In instances when a rail merger has created an access problem -- e.g., where a two rail carriers merge and some of their shippers previously could ship on either carrier and now would become "captive" to the merged carrier -- one regulatory response by the ICC/STB has been to mandate that the merged entity grant "trackage rights" to a third rail carrier to serve those shippers.⁸ In essence, the third carrier is permitted access to -- permitted to run its trains over -- the merged carrier's rail lines in order to serve the otherwise captive shipper. The third carrier (which we will call "the entrant") pays fees to the merged entity for this privilege.⁹

This form of remedy has been popular with the ICC/STB, which has apparently believed that such arrangements provide a completely equivalent substitute for the competition that has been

⁷ One such conceptual approach to regulated rates for access, the "efficient component pricing rule" (ECPR), is the subject of a companion discussion paper for the Network Access Project by Lawrence J. White.

⁸ In the case of the UP/SP merger that the STB approved in 1996, the UP/SP arranged prior to the merger for an extensive trackage rights arrangement with the Burlington Northern Santa Fe (BNSF), which the STB then blessed (but added to) in its approval decision. See Kwoka and White (1999).

⁹ A discussion of trackage rights, as well as other forms of carrier access arrangements, can be found in Pinkepank (1979).

eliminated by the merger. Closer analysis, however, reveals substantial flaws in this type of arrangement.

With trackage rights, the entrant carrier is, in essence, a tenant on the bottleneck carrier's tracks, renting access from the latter. In the absence of any further regulatory intervention, the bottleneck carrier "landlord" holds all of the cards and can structure the price and non-price terms of the arrangement so as to limit the tenant's ability to challenge the market power of the landlord.¹⁰

With respect to price, the landlord carrier can set fees that are sufficiently high so that the tenant carrier cannot effectively set rates that are below the monopoly level.¹¹ As for non-price elements, since the landlord carrier controls the dispatching and access to complementary facilities, it can effectively degrade the tenant carrier's service quality sufficiently so as further to mute any competitive threat that might otherwise be forthcoming from the tenant. Further, as trackage rights become more extensive and involve longer hauls by the tenant carrier over the landlord carrier's tracks, the tenant becomes more dependent on the landlord for support facilities (e.g., crew change facilities), making the exercise more costly and less worthwhile for the tenant. Finally, the extensive sharing of information that would be involved in a trackage rights arrangement could well encourage coordinated, noncompetitive behavior.

D. Reciprocal voluntary access.

In many metropolitan areas, where carriers have located marshalling yards that are in close proximity to each other, they have often worked out "reciprocal switching" arrangements with each

¹⁰ The parallels between the problems of trackage rights arrangements in rail and the problems of the leasing of unbundled network elements (UNEs) in telephony are quite close.

¹¹ ICC/STB criteria for pricing trackage rights are set out in St. Louis Southwestern Ry. Co. Compensation—Trackage Rights 1 ICC 2nd 776 (1984) et seq. Tenant carriers have long complained that the discretion granted by these rules to the landlord carrier often precludes effective competition.

other. Under these arrangements, though a shipper (or a recipient) may have a direct rail connection to only one carrier's tracks, that carrier permits the switching locomotives of a neighboring carrier to pick up (or deliver) rail cars from that shipper (or to that recipient). These arrangements apply only to trips of short distances within these metropolitan areas. The carriers negotiate these arrangements with the expectation that the balance of traffic (either within that metropolitan area or across all such arrangements) will be roughly even and thus that each carrier will generally benefit from the greater flexibility and access that is thereby gained.¹²

Though the ICC/STB has had the power to require reciprocal switching in places where it is not present, the agency has generally not used this power.

E. Joint ownership.

In a few instances (e.g., terminal facilities in St. Louis and Chicago), a number of railroads have jointly owned the facility.¹³ For the joint owners, access is no longer a problem.¹⁴ For non-owners, the access problems remain.¹⁵

F. Divestiture of duplicative facilities.

¹² As a theoretical matter, it seems likely, however, that if the structural arrangements were that there was a dominant carrier and one or more smaller carriers, the dominant carrier's incentives would be to avoid reciprocal switching arrangements, in the hopes that this impediment to access would sufficiently weaken the smaller carriers so as to lead to their demise (or to their willingness to merge with the dominant carrier on terms that were favorable to the latter).

¹³ There is a parallel here with the multi-firm ownership of the Trans Alaska Pipeline (TAP).

¹⁴ There is, though, the danger that the joint ownership could become the vehicle for restricted competition among the owners. It could be the means by which extensive information is shared. Or it could levy high marginal fees on the carriers' operations, thereby raising effective prices above competitive prices, and then return the fees in a non-marginal fashion.

¹⁵ Indeed, it was the joint ownership of the St. Louis terminal facility that gave rise to the "essential facilities" doctrine in 1912; see U.S. v. Terminal Railroad Association of St. Louis, 224 U.S. 383 (1912).

Sometimes mergers (outside of the railroad industry) threaten to create market power in one or more product and/or geographic markets. A standard antitrust remedy in such instances is to require the merging entity to divest sufficient duplicative facilities in those markets to viable purchasers, so as to reduce market concentration sufficiently to sustain adequate competition.¹⁶ For example, if a merger were proposed between two banks that had extensive branching structures and overlaps in some metropolitan areas would create high levels of concentration, the requirement of the divestiture of some branches in those areas (sufficient to sustain adequate post-merger competition) is near-automatic.¹⁷

Divestiture has not been a common remedy for similar merger-created problems in the railroad industry. The merging carriers always argue that the duplicative facilities have important value in reducing congestion or improving the quality of service to shippers, and the ICC/STB has accepted these arguments. Instead, as noted above, the ICC/STB has either ignored the resulting market power or has tried to remedy them with trackage rights arrangements.¹⁸

G. Vertical separation

A more radical proposal to resolve these incentive problems involves vertical de-integration of railroads: the creation of one company comprising track and related infrastructure, and a separate

¹⁶ Ensuring that a viable firm purchases the facilities is a crucial and sometimes difficult part of effective antitrust enforcement, since the merging entity would usually prefer that the purchaser quickly disappear from the market. For further discussion, see FTC (1999) and Foer (2001).

¹⁷ Divestiture is far more rare as a remedy in monopolization cases; but it does occur, as in the 1982 AT&T consent decree and in the initial district court decision in U.S. v. Microsoft.

¹⁸ To illustrate again the competitive problems with trackage rights arrangements, let us continue with the bank-merger-and-branches example. Suppose instead of requiring the divestiture of branches in the problematic metropolitan areas, the Antitrust Division instead simply required that the merging bank rent space in those branches to an entrant; few (if any) antitrust analysts would consider that to be an adequate remedy for the market power problems that could arise.

set of companies that own and operate the rolling stock and do the actual shipping. The operating companies would pay the track company for use of its facilities, but by virtue of a prohibition on its involvement in transport, the track company would have no reason to favor any one purchaser of its services; discriminatory access would cease to be an issue. With appropriate regulation, some economists and policy-makers have argued, the track company can be made to provide cost-based, non-discriminatory service, facilitating the emergence of a viable competitive transport sector.¹⁹

Until recently there have been no actual examples of this arrangement for rail, but Sweden, Argentina, and the U.K. have now adopted versions of this, and there has been a legislative proposal for U.S. passenger rail service with some similarities (World Bank, 1999). The U.K. unbundled British Rail in 1994, and privatized the various elements in 1997. Railtrack was constituted as the single owner of infrastructure, contractually serving dozens of freight transport companies and two passenger rail companies. It is widely believed that regulation of Railtrack gave it little incentive to maintain track, leading to deterioration of conditions and service (including major accidents), and ultimately to Railtrack's bankruptcy in 2001. Railtrack is now being reconstituted (Office of Rail Regulator, 2001).

In the U.S., dissatisfaction with the performance of rail passenger service has led to a recent proposal that Amtrak be divided into two companies. One would own the infrastructure that Amtrak inherited in the Northeast -- the only region where it owns track -- while the second would operate passenger train service (Amtrak Reform Council, 2002). At some future date additional franchised passenger service on the same track is foreseen.

¹⁹ In an important sense, vertical separation currently characterizes truck transport: The roads are public facilities (plus a handful of private toll roads), while separate truck companies own and operate their equipment, and all have equal access to the roads. Vertical separation also characterizes the theory behind the divestiture of AT&T in 1982: The bottleneck local operating companies remained regulated and were to be kept separated from the long distance companies, so as to ensure non-discriminatory access by the latter. And the same idea applies to the current ideas in electricity, of separating (regulated) bottleneck local distribution from competitive generation, so as to ensure non-discriminatory access for the latter.

H. A summing up.

There are potential solutions to the access problem, but none are perfect. In the context of mergers, divestiture of duplicative facilities is the strongest remedy; but it is the remedy that the ICC/STB has generally eschewed. Instead, the agency has generally embraced the creation of trackage rights for a third carrier; but, as we argued above, this is a weak remedy indeed.

IV. WHERE TO GO FROM HERE

This survey of freight rail makes clear that this industry faces significant issues of providing non-discriminatory access and ensuring bona fide competition. We think at least the following issues could usefully be studied further:

- The record of access and prices under trackage rights. There is a record of shipper and competitive carrier complaints, and much economic reason for concern, but systematic evidence on contracts, prices, service, characteristics of haul, etc., is lacking.²⁰
- Evaluation of the access experience following the BN-SF and UP-SP mergers of the mid 1990s. Partly this evaluation would relate to the trackage rights research just discussed. But the opponents to these mergers claimed that the trackage rights granted did not fully address many access problems.
- Evaluation of experience with vertical separation. The "clean" break of separation often is muddled by the difficulty of establishing the correct incentives for all parties. The experiences of Argentina, Sweden, and the U.K. bear further examination.

²⁰ Amtrak's experience in securing passage for its trains might be examined as a benchmark, since the companies from which it contracts for passage are freight railroads that do not compete with Amtrak. This example is muddled, however, by the fact that freight railroads often find that passenger service disrupts their scheduling of freight traffic on the same lines.

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Figure 1: A stylized rail network

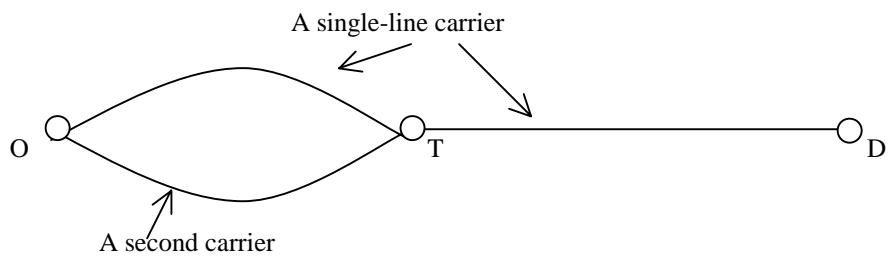


Figure 2: The problem of access