Institutional Reform of Intercity Railways in the U.S.

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Railway institutional changes in the U.S. since the early 1970s have transformed the sector. Creation of Amtrak removed the burden of passenger losses from the freight railroads and allowed intercity passenger services to stabilize. Deregulation of the private freight railroads put the industry on a stable basis, improving earnings, increasing investment and reducing tariffs to shippers. The future of the sector depends partly on political will to support passenger services and not to re-regulate freight, and partly on the success of projects to establish new passenger services in Florida and California.

Railways employ distinct technologies: steel wheels on steel rails furnishing low rolling resistance; long, thin shape yielding low wind resistance; and, potential for electric traction with higher energy efficiency and lower carbon emissions. Railways can move high volumes within a restricted space and are extremely safe. But, rail has limited flexibility to serve areas outside its immediate reach and is less competitive at shorter distances.

The **role** of the railway is driven by the railway's capabilities, but also by its competitors and by the geographic, demographic and institutional framework within which the transport system functions. Autos are more flexible, but use more energy and land space. Trucks are flexible, do not require high volumes and move at higher speeds, but also have higher costs and impact on the environment. Airlines are fastest over long distances, but use much more energy. Above the network is the country's institutional framework, including policies toward public funding and the mix of public/private roles and the role of regulation.

The outcome is a complex pattern of technologies and services. The pattern is never fixed: technologies evolve, governments shift with political currents and the structure of the economy develops. This is especially true of the U.S., partly because of its leading role in development of transport technologies, but also because reliance on competition and private ownership fosters an unusual flexibility to change both in the transport sector and in the economy at large. Table 1 gives an overall picture of the intercity rail system in the U.S.

Railways in the U.S. carry short-haul intercity passengers

Table 1

Structure of the U.S. Intercity Rail System

		Description	Institutional Status	Source of Finances	Traffic Trends: 2014 to 1995	Issues
Amtrak	Short Haul	Low frequency, diesel hauled "day" trains	Operated by Amtrak, sometimes with contract with states served	Mostly Federal, but state subsidies in some lines	Solid growth: trip length decreasing slightly	Congress has asked for greater state role in planning and financing these services: likely to lead to greater state role in operations
	Long Haul	Low frequency, diesel hauled, overnight trains with sleepers and diners	Operated by Amtrak.	Wholly Federal	Relatively slow growth: trip length decreasing slightly	Funding stability and route structure: more service is "needed" that Congress is willing to pay for
	NEC	High frequency, higher speed (125 to 150 miles/hr, electrified)	Operated by Amtrak	Wholly Federal, Amtrak breaks even on operations, but may need capital support	Good growth, Acela doing better than Regional service.	Restructuring Amtrak organization to separate NEC performance from rest of system. Possible separation of NEC infrastructure from operations on an accounting basis
Private railroads	Freight	Diesel hauled, heavy, long trains	Owned and operated by private companies	Private and profitable: very minor Federal involvement	Good growth and solid profitability	Loss of coal and other carbon-related traffic; potential "re-regulation"

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Table 2

Statistical Picture of the U.S. Intercity Rail Transport System

	Intercity Rail Passengers (000).*										Freight Traffic**	
	Passenger Trips (000)					Passenger-Miles (000,000)					Tons	Ton-miles
	Acela	NEC Reg.	Short Haul	Long Haul	Total	Acela	NEC Reg.	Short Haul	Long Haul	Total	000,000	
1960	na	na	na	na	122,669	na	na	na	na	17,064	1,241	572,309
1965	na	na	na	na	106,283	na	na	na	na	13,260	1,387	697,878
1970	na	na	na	na	77,879	na	na	na	na	6,179	1,485	764,809
1972	na	na	na	na	13,700	na	na	na	na	4,154	1,448	776,746
1975	na	na	na	na	15,800	na	na	na	na	3,932	1,395	754,252
1980	na	na	na	na	21,219	na	na	na	na	4,504	1,492	918,958
1985	na	na	na	na	20,776	na	na	na	na	4,828	1,320	876,984
1990	na	na	na	na	22,200	na	na	na	na	6,057	1,425	1,033,969
1995	2,001	5,872	6,488	4,035	20,700	284	992	1,032	3,122	5,430	1,550	1,305,688
2000	2,408	6,113	8,023	3,911	22,500	353	950	1,304	2,759	5,365	1,738	1,465,960
2005	2,453	7,116	10,415	3,970	24,164	421	1,070	1,294	2,530	5,315	1,899	1,696,425
2010	3,219	7,149	13,627	4,678	28,717	610	1,096	1,817	2,799	6,322	1,851	1,691,004
2014	3,545	8,083	14,732	4,543	30,903	671	1,253	2,052	2,765	6,741	1,840	1,851,229
%2014 to 1995	177	138	227	113	149	236	126	199	89	124	119	142

* First full year of Amtrak operations was 1972

** Railroad deregulation passed in 1981

Sources:

Amtrak data: Amtrak Annual Reports for various years, Amtrak Monthly Peformance Summaries (author's calculations) and Surface Transportation Board Statistics of Class I Railroads

Freight data: Surface Transportation Board (or Interstate Commerce Commission), "Statistics of Class I Railroads," various years

between closely spaced cities, typically within one state, as well as long-haul intercity passenger services that often operate interstate with sleeper and diner services. At the same time, and often over the same tracks, U.S. railroads haul enormous quantities of freight. Table 2 gives an overall picture of the scale and trends of rail operations of the U.S. rail system.

Intercity passenger services in the U.S. were originally provided by private railroads. Although these services could be sustained before the advent of the automobile, this became more difficult after World War II. The ability of most families to have a car, the construction of the Interstate Highway System and the emergence of the jet airplane destroyed the intercity rail passenger market and, by 1970, passenger losses were seriously weighing on the private freight railroads.

The government's response was to create Amtrak, a federally owned corporation intended to relieve the freight railroads of all intercity rail passenger service beginning in 1971 and to revitalize passenger service under new management. Over its lifetime Amtrak has undergone continual restructuring and reorganization as Congress and the President have struggled to reach a stable definition of Amtrak's role and amounts and sources of funding.

Amtrak reports its operations in three lines of business: 25 short-haul "day" services that operate over the tracks of freight railroads (paying access fees), mostly within a single state and mostly with one train/day in each direction though some routes have multiple daily frequencies; 15 long-haul trains, mostly with diners and sleepers and mostly once-daily frequency, all of which operate over the lines of freight railroads and pay access fees; and, the Northeast Corridor between Washington, DC and Boston, MA through New York City where there are 38 higher-speed services and 48 medium speed services daily together carrying about 38% of Amtrak's passengers and generating 54% of its revenues.

By Amtrak's accounting, the long haul trains are money losers ($530 million in 2015). The short haul trains appear to be less unprofitable ($86 million in 2015) and the Northeast Corridor trains have an operating profit of about $482 million, though it is not clear what share of the cost of the infrastructure they are carrying (Amtrak, MPS). Amtrak owns and maintains most of the Northeast Corridor infrastructure and charges commuter and freight operators for access. The relative performance of the lines of business is clouded by the fact that many of the short haul trains receive state support (which Amtrak counts as revenue) and Northeast Corridor results are impacted by unclear sharing agreements with local commuter authorities and freight operators.

Whether Amtrak has been a success depends on the point of view. One objective, separating passenger losses from freight finances, was clearly achieved and, in conjunction with freight deregulation, permitted the freight railroads to remain in private hands. The success of revitalizing passenger service was not met as well: Amtrak's traffic has

not grown rapidly and its cost, at $70 billion ($2015), has been high.

The U.S. railroad freight system consists of 7 large ("Class I") freight railroads, all of which are privately owned, along with 21 smaller "regional" railroads (again all private) and some 546 small "short lines" that are mostly privately owned and operated, though some are owned by state or local authorities. The Class I railroads account for about 70% of the track-miles and 95% of the revenues of the overall U.S. rail system (AAR, 2015).

The U.S. rail freight system is an example of one of the most successful cases of institutional reform in the last four decades. In the early to mid-19th century, the railroads occupied a near-monopoly position in most markets and they were not particularly shy about exploiting their position. This, along with the flamboyant excesses of early rail investors ("Robber Barons") generated great political opposition. In 1876, the Congress created a regulator (the Interstate Commerce Commission) aimed at reining in the railroads' economic and political power.

Unfortunately, as often happens with public regulators in the political arena, the objectives were not well defined and were actually perverse in their economic impacts. Over time, the system morphed from limiting monopoly power into limiting railroads' ability to compete with highways and barges. At the same time, federal and state programs that built highways and waterways without making trucks and barges pay an appropriate share for their use began to weigh heavily on the financial performance of the private rail system. Regulatory policies to force the private railroads to cross-subsidize passenger service out of freight "profits" added insult to injury and, by 1970, much of the system was badly weakened financially.

Congress acted first to create Amtrak in order to remove the passenger support burden from the railways and put it on the federal and state governments where it belonged. Though helpful, this was not enough and by the mid-1970s, most freight railroads in the Northeast were bankrupt. In response, the Congress first nationalized the Northeast rail system and reorganized, rehabilitated and refinanced the system with public money. Then it re-privatized the system (creating Conrail). When it became clear that even this was not enough, the Congress took the final step and deregulated the railroads in 1981 (along with airlines in 1979 and trucking in 1981).

For the freight railroads, deregulation meant that, within very wide limits to control excess earnings and abuse of monopoly power over a single shipper, they could completely control the tariffs and services offered. In particular, railroads could offer contract rates to shippers in which guaranteed tariffs were offered in return for volume commitments, shipper ownership of wagons, railway or shipper investment in specialized facilities and many other terms reflecting a market-driven balance between the benefits and costs available to railway and shipper.

The results of the deregulation of rail freight were remarkable. From inception to about 2004, while traffic (ton-km) grew by 83% and the regulator's measure of return on investment grew from 3.09% to 8.46%, the average freight tariff in real terms **fell** by 58%. Although there were complaints from individual shippers (as there always are), there is little doubt that deregulation far exceeded even the most optimistic of expectations.

How did this happen? Deregulation enabled a rapid increase in productivity, mostly because contract rate-making permitted railroads to work much more closely with shippers to offer more flexible and efficient services. Output per employee grew by 434%; output per locomotive (horsepower adjusted) grew by 34%; and, traffic density (ton-miles/mile of line operated) more than tripled: the increase was driven partly by traffic growth, partly by a reduction in the miles of line operated (abandonments were made easier by deregulation), and partly because of voluntarily negotiated multiple use of lines ("trackage rights") wherein the percentage of tracks with more than one operator grew from 9% in 1981 to 28% in 2015. Over the same period, Class I railroad ownership of freight wagons fell from 66% in 1981 to less than 28% by 2015: this meant that shipper-owned equipment could be more specialized and productive while at the same time relieving railroads of the investment burden.

There were also qualitative changes in the freight system brought about by the freedom that deregulation permitted. For example, container traffic grew from about 2.7 million units in 1990 to nearly 12 million in 2014. Included in this total is traffic for J.B. Hunt, a major trucking company that purchases wholesale capacity from railroads and then markets retail container loads to its customers, many of which do not know (or care) that railroads are involved in the long-haul part of the shipment.

The tariff picture after 2004 has been more mixed because the combination of growth in rail traffic with growing congestion on the U.S. highways (partly caused by inadequate public funding of highway maintenance and construction) meant that the railroads could raise tariffs and they did so, by about 34% through 2014: this was at least partly justified by the need to finance the capacity needed to handle the traffic shifting from roads and the tariffs are still 43% below 1981 levels in real terms. Then, the financial crisis of 2008 caused a drop in traffic from which the rail system has only now fully recovered. With

this said, the current picture of the U.S. freight railroads is one of independence, adequate earnings and reasonable future prospects, subject to qualifications discussed below.

The future of passenger services is largely driven by public funding at local, state and federal levels. Unfortunately, the U.S. political system has been increasingly divided over the issue of taxes and effectiveness of governments at all levels. There are no clear prospects for political consensus on the need for passenger service in the near future (if ever). For rail freight, the chief political danger is re-regulation as demanded by various powerful shipper groups or relaxation on truck sizes and weights as demanded by truck lobbyists. Paradoxically, since the freight railroads benefit from the regulatory status quo, political inaction is their friend.

Beyond politics, there are other portents. The need to reduce carbon emissions could be critical. Although powerful political forces continue to deny the fact of climate change for ideological or self-interest reasons, there is a growing consensus that the U.S. must participate in global programs to reduce carbon emissions and the U.S. is increasingly committed by treaty to do so.

The energy efficiency of rail and the ability to use electric traction generated from low carbon sources gives rail an advantage if carbon emissions are traded or taxed. This is not an overwhelming advantage, however, as the economic cost of reducing carbon emissions by investment in rail can often be much higher than alternative programs such as LED lighting or home insulation. Carbon emission reduction is a positive result, but must be combined with other benefits such as time savings, lower tariffs, safety or noise reduction if increased spending on rail passenger service is to be justified.

Carbon reduction cuts both ways for freight. On the one hand, railways are energy efficient and thus would benefit from traffic shifted from less efficient trucks, assuming that carbon is efficiently priced. On the other hand, a large percentage of the world's carbon-based fuels are transported by rail and any carbon emission reduction program will reduce rail traffic, especially coal. Since coal makes up about 39% of U.S. rail freight traffic, and is one of the most profitable commodities, carbon reduction programs are a threat to U.S. railways unless other technologies, such as carbon capture and sequestration, are implemented.

There are good reasons to expect continued evolution of rail passenger organization in the same direction as in the past few decades. Amtrak short haul lines will increasingly be shifted to a higher share of state financing, which will ultimately cause the states to ask for a greater role in planning and operating the systems. Amtrak has tended to lose competitions for operation or maintenance contracts because of its high costs and rigid work conditions, so Amtrak's role in short haul services may well shrink. The existing Amtrak long haul lines appear to be in rough equipoise between the Congressional forces wanting service to their state or district and the budgetary forces that are reluctant to pay: except at the margin, little change is likely.

The Northeast Corridor represents about 30% of the U.S. population on 9% of its land area and most resembles areas in Europe and Asia where longer haul, higher speed rail passenger service makes economic sense. Given adequate funding (always difficult), continued upgrading and rehabilitation of the Northeast Corridor would be a good investment. The challenge will be to create a new institutional framework, possibly based on a form of infrastructure separation that would more clearly assign responsibilities for investment and operation among all the commuter, intercity passenger and freight operators that the NEC serves. It seems unlikely that a visionary new Northeast Corridor line serving exclusively high-speed trains can ever be built because of the enormous cost.

Two entirely new intercity passenger services are in prospect. All Aboard Florida is a wholly privately financed, medium-speed service that expects to start service on a three hour schedule on the 235 mile route from Miami to Orlando in 2017. About 50 miles of line between Cocoa, FL, and Orlando International Airport will be on newly constructed tracks: the remainder will be conducted on tracks of the Florida East Coast Railroad, whose parent company is the sponsor of the project. The outcome of the project, especially the ridership actually achieved, will be a significant harbinger for the potential for new private sector rail passenger projects.

The California High-Speed Rail project is the only high-speed rail project under construction in the U.S. The 220 mile/hour system will be built in stages, initially connecting San Francisco with Los Angeles and Anaheim, with connections to Sacramento and San Diego added later. The system is designed to deliver 2 hour 40 minute service between San Francisco and Los Angeles. The cost of the project has been estimated at $64 billion for San Francisco to Los Angeles/Anaheim with service to be initiated in 2028. The California High-Speed Rail Authority intends to manage the planning and construction of the system and then to contract or concession operations to a private operator.

The project has been controversial, partly because construction of a major transportation project in an inhabited (and litigious) environment always engenders opposition. More important, though, is finance. California voters approved

a bond issue in 2008 that provided about $9 billion for the system. Federal funds added another $2.9 billion. In addition, 25% of the state's receipts from its carbon trading program have been dedicated to the project. This is projected to yield around $500 million annually until 2025 when the remainder of the funding through 2050 will be monetized to yield another $5.2 billion. Finally, the Authority projects that the system will be profitable and the expected net revenue stream can be monetized in 2028 and 2029. Even so, accepting the Authority's medium demand projection leaves an uncovered gap of at least $15 billion possibly covered through new federal grant programs.

References

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