



PARDEE RAND
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Policy Insight

Getting America Back on Track U.S. Public Policy on Railroads



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The Federal Highway Administration forecasts freight traffic in the United States to grow by approximately 70 percent by 2035. An increased use of rail freight would allow the nation's transportation system to accommodate this increased volume while adding fewer trucks to the congested U.S. highway system. However, at a 2006 workshop, sponsored in part by the Frederick S. Pardee RAND Graduate School, representatives from more than 30 North American freight carriers, shippers, and government agencies expressed concern that the existing railroad infrastructure—much diminished after decades of track abandonment—lacks sufficient capacity to accommodate the anticipated increase in demand for rail freight (Ortiz et al., 2007).

There is further concern that public stimulus may be needed to ensure the adequate provision of rail infrastructure. Recent RAND research demonstrates that an expanded role in infrastructure planning can and should be justified by a careful assessment of the public benefits of the infrastructure (Weatherford, Willis, and Ortiz, 2008). For example, shifting freight from trucks to trains will likely result in fewer highway accidents and greater energy efficiency.

Increased public-sector support for rail freight, at all levels of government, is justified. This *Policy Insight* shows that urgent questions remain concerning how broadly the scope of U.S. public policy on railroads should be expanded.

Concerns About Railroad Capacity and Performance

Concerns about a railroad capacity crunch have focused on the decline in railroad track miles and the potential for rising rates and worsening performance that could result from inadequate capacity. Over the past 40 years, as shown in Figure 1, the total number of miles of track operated by Class I carriers has been halved.¹ Despite this, the

Association of American Railroads (2008) reports that the volume of rail freight carried over that network has tripled during the same time period. This strongly suggests that no capacity constraints existed as of 2008. Railroad capacity is affected by many other factors, including the number of railcars and locomotives, locomotive power, labor availability, signaling technology, and operating strategy. Railroad companies have been able to consistently improve productivity through operational innovations and the use of new technology. Examples of these include containerized cargo, signaling technology that allows trains to run closer together, higher-capacity railcars, and unit trains.²

Publicly available railroad data do not indicate that productivity gains are slowing, but there are, of course, physical limits to how much freight can be moved on the railroad system. The relevant questions are, When will these capacity limits be reached? and What impacts will there be on railroad rates and performance?

Many industry experts believe that railroad capacity constraints are already affecting network performance. RAND's independent analysis revealed anecdotal evidence that railroad rates are rising in real terms for the first time in decades, supporting the view that parts of the network may already be operating at capacity. However, our review of performance statistics did not clearly indicate whether shipment performance had been affected by these capacity constraints.

Over the past 20–30 years, railroads experienced an increase in demand while average rates fell—until 2004 when, as shown in Figure 2, they

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1 The Surface Transportation Board defines a Class I railroad in the United States as "having annual carrier operating revenues of \$250 million or more" after adjusting for inflation; according to the Association of American Railroads, that threshold was \$359.6 million in 2007. Seven Class I railroads, including two headquartered in Canada, currently operate in the United States.

2 A *unit train* is a train consisting of cars all traveling from the same origin to the same destination, typically for a single shipper.

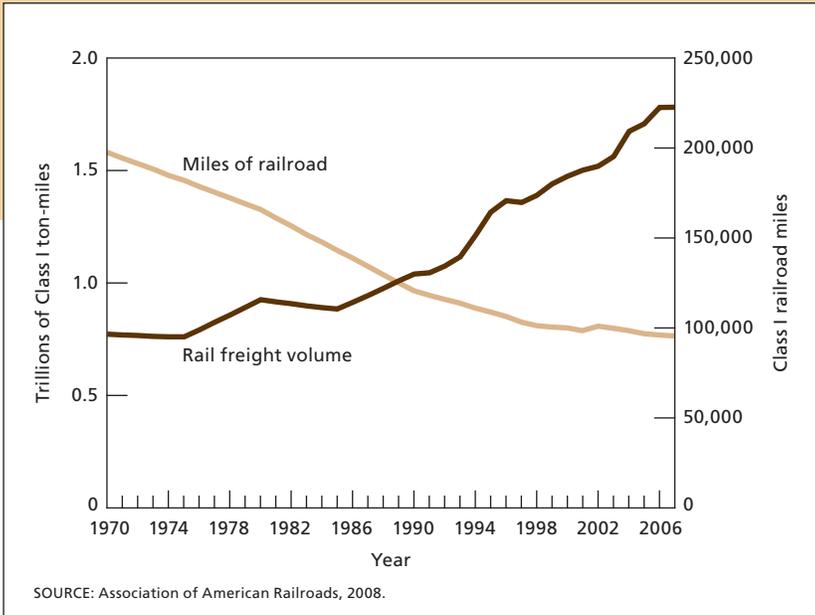


Figure 1. Rail Freight Volumes and Miles of Railroad, 1970–2007

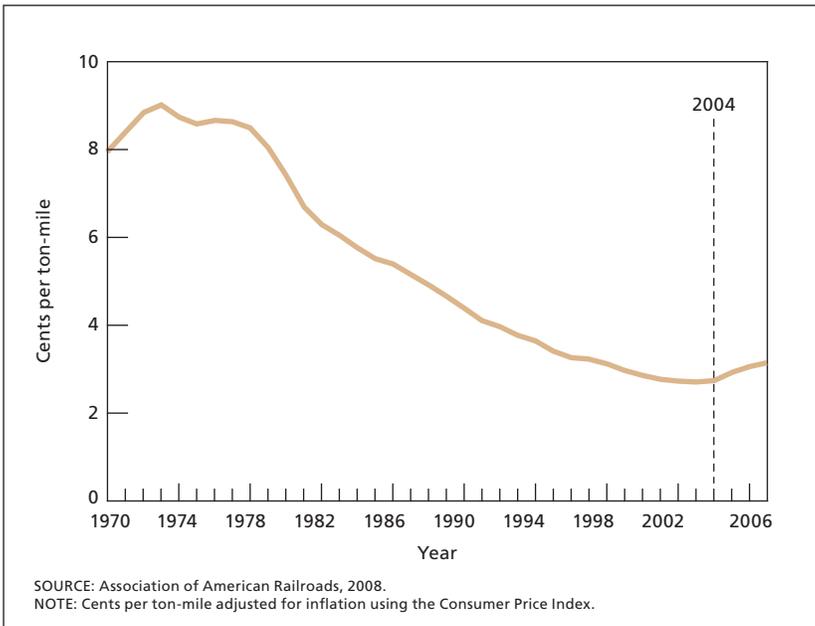


Figure 2. Rail Freight Revenue per Ton-Mile, 1970–2007

started to increase.³ Economists explain that railroads have very large capital costs and relatively low operating costs (Caves, Christensen, and Swanson, 1981; Keeler, 1983). Under these conditions, railroads can be expected to cut rates in order to attract customers and raise rates only when demand approaches capacity. The recent rate increases support the belief that capacity constraints exist, at least along some rail corridors.

³ Actual rate data are proprietary, so freight revenue per ton-mile is typically used as a proxy.

Shippers and rail industry observers are concerned that tight railroad capacity will erode the speed and reliability of rail shipments. Our review of publicly available performance measures does not tell a clear story about performance trends; the data are too highly aggregated over too short of a time period to draw any conclusions. There is a good reason to believe, however, that tightening railroad capacity may not degrade performance.

Railroads are not like highways, where use is uncoordinated and based on each driver's individual demand for travel. The common result for highways is congestion as traffic volumes approach the capacity of the road. Rail traffic, in contrast, is centrally managed by dispatchers. Many operating characteristics of trains, such as their speed and length, can be managed to avoid congestion. To avoid railroad congestion and excessive train delays, railroad operators can adjust how they operate their networks using a variety of tools, including

- constructing parallel tracks or long passing sections so that trains do not have to stop when they are passed
- increasing speed so that more trains can be accommodated per day
- standardizing operating speeds so that trains pass less often
- increasing train length and rail car capacity so that more freight is hauled per train
- implementing new technologies to reduce train spacing and increase speeds
- developing pricing strategies to increase or reduce demand.

By changing these characteristics, railroad operators also change the capacity of the network and shipment performance.

External Costs of Trains Are Often Lower Than Those of Trucks

Shippers work hard to find ways to reduce total supply chain costs and therefore seek to minimize transportation costs as well as inventory costs. Adjustments that railroad operators make in managing their operations have impacts on the cost,

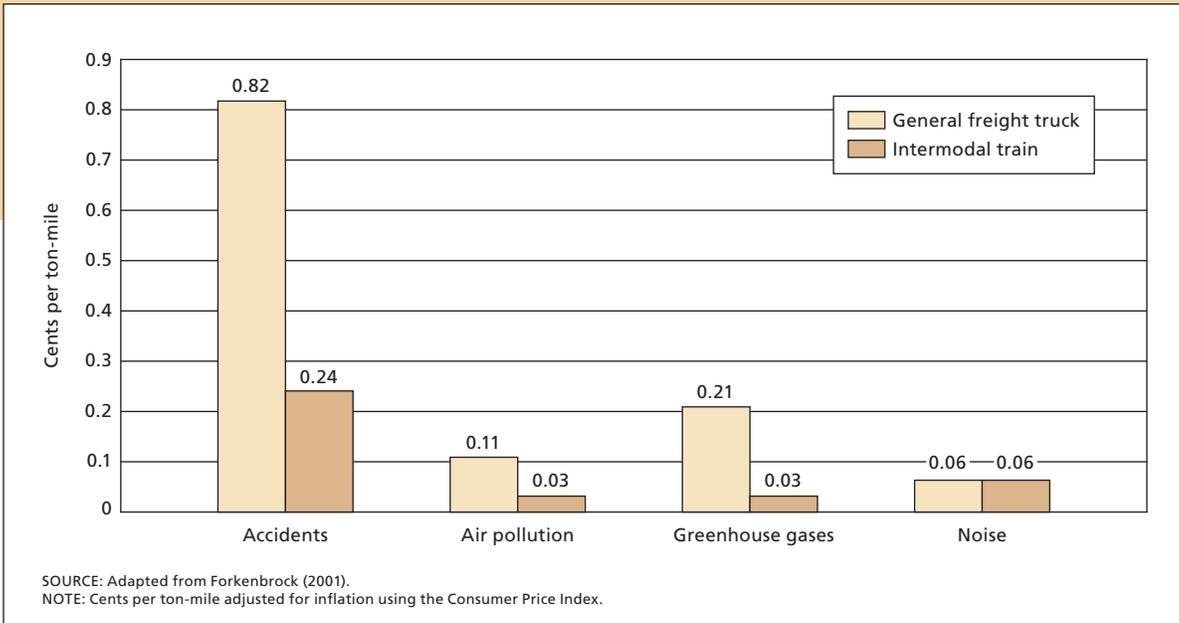


Figure 3. Comparison of External Costs of Truck and Train Freight Transportation

speed, and reliability of railroad service. Slower travel times and uncertainty about delivery dates and times force manufacturers and retailers to hold more inventories at greater cost. If capacity constraints lead to even slower and less reliable service, inventories and other logistics costs will increase correspondingly.

Railroads and trucking companies take actions that influence the overall cost of shipping freight, and shippers respond to these signals accordingly. Thus, when a railroad or trucking firm improves performance, shippers may respond by shifting the transportation of freight—even extremely time-sensitive shipments—from one mode to the other.

For example, railroads compete directly against trucks in the intercity freight transportation market. For large volumes of freight, trains can match the speed of trucks, at a lower cost to the shipper. In addition, long-haul trucks have greater impact on pollution, traffic accidents, noise, and the emissions of greenhouse gases than trains operating over similar distances. A recent study of these external costs borne by society, summarized in Figure 3, found that the total social cost of hauling a ton-mile of freight by truck is more than three times as much as by intermodal train (Forkenbrock, 2001).⁴ The difference is \$0.0085 per ton-mile, which sounds minuscule by itself, but the dollar values add up quickly. In 2006, railroads hauled 12.3 million trailers and intermodal containers, representing approximately

40 billion ton-miles. At these volumes of freight, small percentage shifts between modes would easily result in hundreds of millions to several billion dollars in changes in the societal costs of freight transportation. These estimates demonstrate the magnitude of the benefits to society from shifting freight among transportation modes.

Recommendations for Public Policy

The public sector directly funds the construction and maintenance of highway infrastructure. This policy ensures free and open access to all highway users, including heavy freight trucks, which then pay for their use of the highways in the form of motor fuel taxes. By financing the construction and maintenance of highway infrastructure through fuel taxes, the public sector insulates trucking firms from fluctuations in the demand for freight transportation; when the economy slows, and the demand for truck transportation slows along with it, this cost to trucking firms falls as they consume less fuel. In contrast, railroads own their infrastructure and must maintain it regardless of economic conditions.

Railroads have and will continue to invest in expanding capacity, but recent studies from the consulting firm Cambridge Systematics (2007) suggest that railroads will be unable to fully fund the additional capacity to accommodate all of the projected growth in rail freight. This means that the performance of rail freight service could worsen and that thousands of trucks may be added to the highways.

Railroads are not like highways, where use is uncoordinated and based on each driver's individual demand for travel.

⁴ This value excludes highway congestion costs, which would likely favor trains as well.



To address this, Congress has proposed extending tax incentives for railroads and shippers who invest in expanding railroad capacity. In addition, some states provide funding for public-private partnerships to eliminate highway grade crossings to improve safety and to expand railroad terminal capacity for economic development. There has been a call by industry and state transportation officials for new federal funding to be invested in expanding rail infrastructure when the next federal transportation bill is authorized in 2009.

Expanding the scope of public policy through measures such as these would be a dramatic increase of public investment in a privately owned transportation system, but the potential public benefits from greater usage of rail to transport freight over long distances justify careful analysis of these proposals. Before the public sector moves forward with providing these subsidies, it is important to identify where the public will benefit most from new rail capacity. Doing so requires more detailed data, better intermodal transportation models, and the integration of national and local priorities in transportation planning.

At the same time, transportation infrastructure analysts should continue to seek input from the private sector in designing incentives to expand capacity and avoid unintended consequences of transportation policies. For instance, the private sector can help government understand where future freight demand will grow most quickly and how to avoid investing in infrastructure that will be underutilized or that is unnecessary. It is important for the public sector to keep in mind that adding

too much capacity is a costly mistake, because maintaining railroads is nearly as capital-intensive as their initial construction. Forming public-private partnerships forces interaction between sectors, so that planning and investment decisions are made with input from all stakeholders.

Further Reading

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