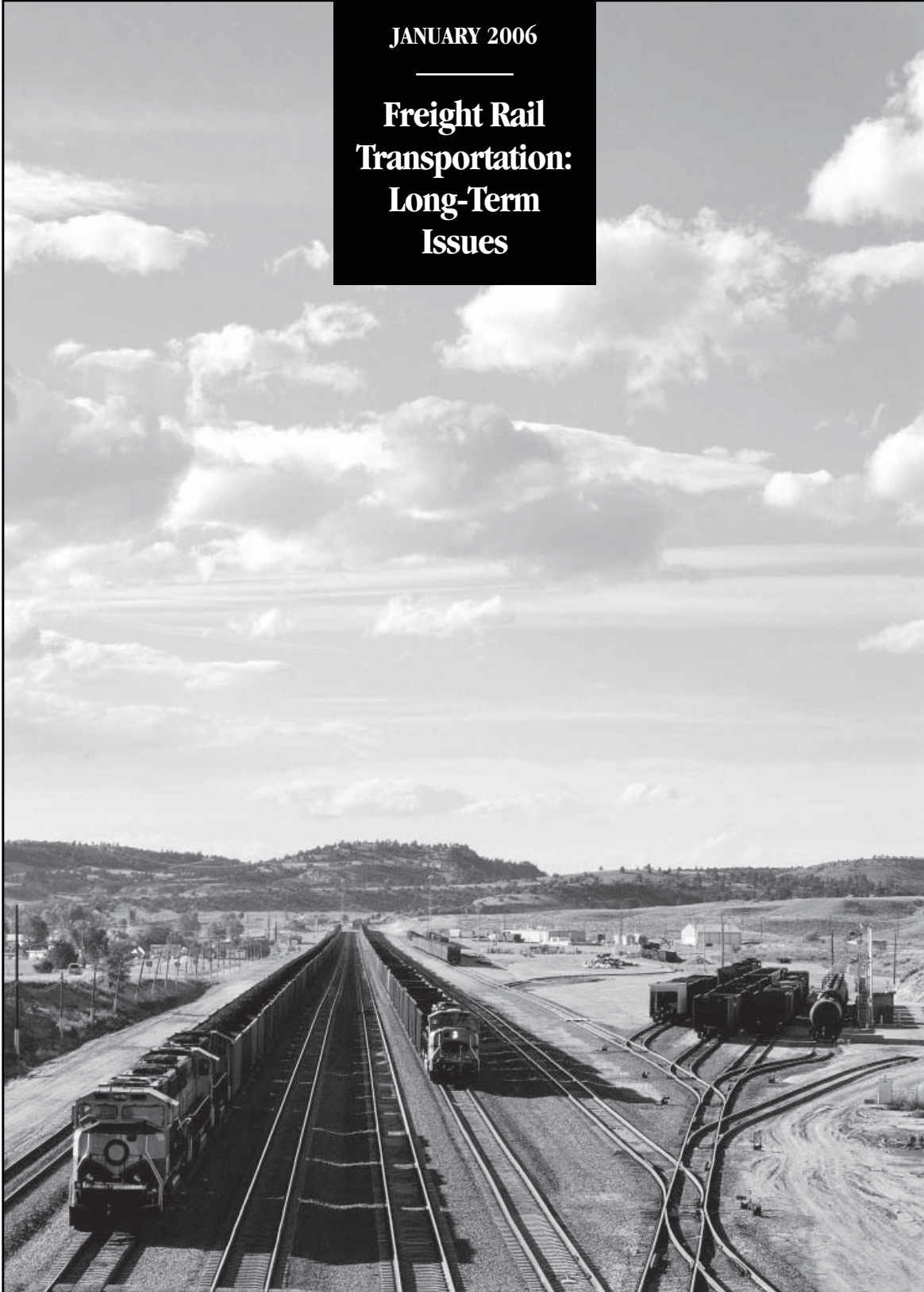


CONGRESS OF THE UNITED STATES
CONGRESSIONAL BUDGET OFFICE

A
CBO
PAPER

JANUARY 2006

**Freight Rail
Transportation:
Long-Term
Issues**





Freight Rail Transportation: Long-Term Issues

January 2006



Preface

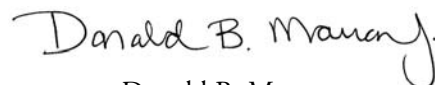
The demand for freight transportation in the United States has been rising—reflecting growth in the economy—and is expected to continue its upward trend. Policymakers and transportation experts have expressed concern about whether the railroads will be able to keep pace with rising demand.

This Congressional Budget Office (CBO) paper—prepared at the request of the House Committee on Transportation and Infrastructure—reviews trends in the demand for and supply of freight rail transportation. After many years of reducing the amount of track and equipment and reducing the size of their workforce, the railroads have begun to increase their capital stock and hire new workers. This paper identifies factors that might affect the railroad industry's investment decisions.

In keeping with CBO's mandate to provide objective, impartial analysis, the paper makes no recommendations.

Elizabeth Pinkston of CBO's Microeconomic Studies Division wrote the paper under the supervision of Roger Hitchner, Joseph Kile, and David Moore. (Roger Hitchner has since left CBO.) Angela McCollough and Craig Cammarata assisted with the preparation of the manuscript and figures. Within CBO, Naomi Griffin, Arlene Holen, Fatimot Ladipo, Rachel Milberg, Robert Murphy, Christopher Williams, and Thomas Woodward provided comments on the draft. In addition, John Frittelli of the Congressional Research Service, Robert Martin of the Federal Railroad Administration, Michael Redisch of the Surface Transportation Board, and Louis Thompson of Thompson, Galenson & Associates provided comments. (The assistance of external reviewers implies no responsibility for the final product, which rests solely with CBO.)

Janey Cohen edited the paper, and Christine Bogusz and John Skeen proofread it. Maureen Costantino designed the cover and prepared the paper for publication, and Lenny Skutnik produced the printed copies.



Donald B. Marron
Acting Director

January 2006



Contents

Summary and Introduction	<i>1</i>
Recent Experience	<i>2</i>
Long-Term Issues	<i>2</i>
The Demand for Freight Rail Transportation	<i>3</i>
The Role of Freight Railroads Today	<i>3</i>
Trends in Freight Rail Transportation	<i>4</i>
Projections of Growth in Demand for Rail Transportation	<i>5</i>
Meeting Future Freight Transportation Demand: The AASHTO Report	<i>6</i>
The Supply of Freight Rail Transportation	<i>7</i>
Railroad Costs	<i>9</i>
Railroad Productivity	<i>11</i>
Financing Railroad Investment	<i>11</i>
Prices	<i>11</i>
Profitability	<i>15</i>
Factors That Might Affect Railroad Investment	<i>16</i>
Ownership of Infrastructure	<i>16</i>
Railroad-Specific Laws	<i>17</i>
Policy Options	<i>21</i>
Policies Related to Ownership of Infrastructure	<i>21</i>
Policies Related to Railroad-Specific Laws	<i>23</i>
Table	
1. Freight Rail Traffic, 1998 and 2020 (as Forecast by the Freight Analysis Framework), by Major Commodity Group	<i>10</i>
Figures	
1. Intercity Freight Traffic, 1965 to 2000	<i>5</i>
2. Freight Carried by U.S. Railroads, 1890 to 2003	<i>6</i>
3. Composition of Class I Railroad Traffic, 2004	<i>7</i>

Figures (Continued)

4.	Freight Transported by U.S. Railroads, 1994 to 2004	8
5.	Distribution of Rail Traffic in 2020 as Projected by the Freight Analysis Framework	9
6.	Train-Miles per Track-Mile for Class I Railroads, 1978 to 2004	11
7.	Railroad Equipment in Service, 1955 to 2003	12
8.	Capital Expenditures of Class I Railroads, 1990 to 2003	13
9.	Railroad Employment, 1955 to 2003	14
10.	Productivity Growth, 1958 to 1999	15
11.	Producer Price Indexes, 1969 to 2004	16
12.	Producer Price Indexes, 1997 to 2004	17
13.	Rail Rate Index, Measured in Revenue per Ton-Mile, 1984 to 1999	18
14.	Comparison of BLS and STB Rail Price Indexes, 1984 to 1999	19
15.	Cost of Capital and Return on Investment, 1990 to 2003	20



Freight Rail Transportation: Long-Term Issues

Summary and Introduction

The freight railroad industry plays an important role in the nation's economy as a mainstay of transportation for many basic industries and, increasingly, for exports and imports that travel by rail to and from the nation's ports. After a long period of excess rail capacity, the pendulum has begun to swing toward tight capacity—at least at certain times and places.¹ Some transportation experts have expressed concern that the railroads are not investing enough to meet rising demand for their services. If they cannot keep pace, the result could be higher costs not only for shippers and consumers but also for taxpayers, because demand that the railroads cannot satisfy is most likely to be handled by trucks and thus require more spending on the construction and maintenance of highways.

The concern expressed about the availability of supply implies a view that the railroad industry is somehow different from most other industries. Most companies in a market economy respond to increases in demand by raising prices, which increases revenues and profits that can then be used to finance expansion. The prospect of profits not only induces existing firms to expand but also attracts newcomers to the industry.

Why might the railroad industry not respond to rising demand as other industries do? Economic factors specific to the railroad industry may reduce its ability and willing-

ness to invest in new capacity. Building new track is costly, and because track is fixed in a specific location, investing in it subjects railroads to the risk that demand will shift to other locations and that the investment will not yield an adequate return. The other major domestic freight transportation industries, trucking and water carriers, do not face that kind of risk; instead, the governments that build and maintain highways and waterways—and the taxpayers who provide their funding—bear that risk.

Government policies may also adversely affect railroads by reducing the costs of competing industries. Although truckers and water carriers pay taxes that help finance the highways and waterways they use, those taxes do not fully cover the cost of the infrastructure. The Federal Highway Administration has estimated that tractor-trailer trucks pay only 80 percent of the highway costs attributed to them, and the heaviest trucks—those over 80,000 pounds—pay only half of their costs.² Barge operators on the inland waterways pay in taxes only about 20 percent of the amount the Corps of Engineers spends on navigation projects.³

Still another factor constraining potential railroad investment could be laws that are specific to railroads, which were enacted when the railroad industry was a dominant force in the U.S. economy. Some of those laws may benefit railroads, but others may impose costs. From 1887,

1. In the transportation industries, "capacity" is usually defined in terms of a level of service, such as how many cars or trains can be handled efficiently and effectively by a facility or network in a given amount of time. Excess capacity exists when inputs—tracks, equipment, and labor—could be used to produce more service than they are currently providing. Capacity becomes constrained when any critical input is in tight supply.

2. Department of Transportation, Federal Highway Administration, *Addendum to the 1997 Federal Highway Cost Allocation Study Final Report* (May 2000). The Federal Highway Administration's estimate includes only government program costs; it does not include pollution or congestion costs.

3. The costs include construction as well as operation and maintenance.

when the Interstate Commerce Act was passed, until 1980, railroad rates, routes, mergers, abandonments, and other economic activities were heavily regulated by the federal government.⁴ The Staggers Rail Act of 1980 removed many of the regulatory restrictions, enabling railroads to operate more efficiently.⁵ But some regulation remains, such as regulation of rates on traffic for which the Surface Transportation Board (STB) finds that one railroad dominates the market, to protect “captive shippers” that have no alternative transportation. Other laws that treat railroads differently from most other industries are the Federal Employers’ Liability Act (enacted in 1908 to cover workers’ compensation), the Railway Labor Act (enacted in 1926 to cover various aspects of collective bargaining), and the Railroad Retirement Act (originally enacted in 1934 to provide pension coverage). There has been little research to address whether those railroad-specific laws adversely affect the railroads in their competition with other modes of transportation.

This paper discusses the growth in demand for freight transportation and explores factors that may affect the railroads’ ability to meet future demand. In general, data on trends in costs, productivity, and profitability suggest that the railroad industry has been moving forward in adding to capacity, although the picture is not entirely clear. By several measures, the amount of capital investment in the railroad industry has been fluctuating or declining; employment is well below its historical peak and has been drifting downward until recently. Yet productivity has risen markedly, enabling the railroads to provide more transportation services with fewer resources.

Government policies that affect railroads often affect other transportation industries, and vice versa. If an aim of public policy is to encourage efficiency across transportation modes—that is, for railroads, trucks, and water carriers to carry the types of shipments for which they are best suited—then any policy changes should comprehensively consider the effects on all modes.

4. As initially enacted, the Interstate Commerce Act provided relatively weak regulation, but regulatory controls were increased substantially in ensuing legislation.

5. The Staggers Rail Act of 1980 (Public Law 96-448, 49 U.S.C. 10101 et seq.).

Recent Experience

In 2004, shippers and policymakers were sufficiently concerned about the ability of railroads to meet unprecedented demand that the chairman of the Surface Transportation Board asked the heads of the seven major freight railroads about their plans for meeting the upsurge.⁶

The railroads responded that they were taking a number of measures—hiring more workers, adding more locomotives and cars, rerouting traffic, and seeking help from shippers—to accommodate the rising demand. By the end of the fall peak season, the railroads had been able to meet most of the demand, and the feared “meltdown”—as it was referred to in the press—had been avoided.⁷ Demand has remained strong, however, and in June 2005, the STB chairman again asked the railroads how they intended to meet the demand for the coming fall peak season.⁸ The railroads cited continued efforts to increase capacity. It appears that actions by both shippers and railroads in anticipation of rising demand have mitigated congestion in 2005.⁹

Long-Term Issues

Over the next 20 years, if demand for rail transportation continues its rapid rise, the railroads will need to invest in new tracks and equipment to keep pace. At least two major transportation organizations have expressed concern about whether capacity will be sufficient to meet freight demand. The Transportation Research Board (TRB, a unit of the National Academies) appointed a special com-

6. Letter from Roger Nober, Chairman, Surface Transportation Board, to the heads of the seven Class I freight railroads, June 9, 2004, available at www.stb.dot.gov/stb/docs/fallpeakletter.pdf. As the successor to the Interstate Commerce Commission, the STB has jurisdiction over certain economic aspects of the rail industry. The Federal Railroad Administration regulates rail safety.

7. Congressional Budget Office, *Freight Rail Transportation: A Review of the 2004 Experience* (May 2005).

8. Letter from Roger Nober, Chairman, Surface Transportation Board, to the heads of the seven Class I freight railroads, June 15, 2005, available at www.stb.dot.gov/stb/docs/fallpeakletter2005.pdf.

9. See, for example, Laura Mandaro, “Ports, Rails, Retailers Plan Ahead to Avoid Import Logjam Again; Ship Early, Work Late,” *Investor’s Business Daily*, National Section (August 15, 2005), p. A01. Track problems recently have caused disruptions in coal service by the Union Pacific Railroad and BNSF Railway from the Powder River Basin in Wyoming. Hurricane Katrina has also caused damage to key rail lines.

mittee to study potential problems. The committee found that “Rail capacity constraints and recent service problems are discouraging to the hopes of state and federal officials, environmentalists, and motorists that rail can relieve highways of part of the burden of truck traffic growth.”¹⁰ The report further summarized concerns about rail capacity over the long run:

Taken together, the trends have indicated to many observers a pattern of unprecedented tight capacity in certain parts of the freight transportation system, expected continued growth of traffic, and slowing of the rate of addition of capacity in response to various external constraints.¹¹

The American Association of State Highway and Transportation Officials (AASHTO) also commissioned a study of future rail capacity and demand. The resulting *Freight-Rail Bottom Line Report* examined the need for future highway investments under alternative assumptions about the potential contribution of railroads to meeting freight transportation demand.¹² Based on what railroads had been spending on investment, it found that the railroad industry would be unable to generate enough funds for investment to maintain its current share of freight transportation.¹³

More recently, a report issued by the Hudson Institute expressed similar concerns, concluding that “given little or no change in government programs and policies there are likely to be significant strains on the capacity of the national freight system over the next 10 to 20 years.”¹⁴ Among other sources of demand, the report noted that the growth in international trade may require better transportation service between ports and inland cities.¹⁵

10. Transportation Research Board, *Freight Capacity for the 21st Century*, Special Report 271 (Washington, D.C.: National Research Council, 2003), p. 19.

11. *Ibid.*, p. 109.

12. American Association of State Highway and Transportation Officials, *Freight-Rail Bottom Line Report* (Washington, D.C.: AASHTO, January 2003), available at freight.transportation.org/doc/FreightRailReport.pdf.

13. *Ibid.*, p. 3.

14. Sergio J. Ostria, “Freight Transportation,” Part II of Hudson Institute, *2010 and Beyond: A Vision of America’s Transportation Future* (Noblesville, Ind.: Hudson Institute, 2004), p. 111.

In recent years, the railroads have been making new investments, even though their profitability has fluctuated and has generally remained below the cost of capital as estimated by the Surface Transportation Board. They have increased productivity markedly and increased employment in 2004 after decades of steady employment declines. They have been able to raise prices on some traffic, despite the fact that overall revenue per ton-mile has generally declined.¹⁶ Those developments may ease concerns about the ability to meet future demand, although it is unclear whether the railroad industry will invest quickly enough to avoid disruptions.

The Demand for Freight Rail Transportation

The demand for freight transportation is derived from the demand for the goods themselves. No intrinsic value, or utility, arises from moving a trainload of coal, grain, or imported goods; rather, the value of the transportation derives from the value of consuming or using the good at its destination.

The demand for freight transportation depends primarily on the overall amount of economic activity; the type of economic activity (for example, the relative amount of goods, which have to be transported, and services, which do not); and the location of economic activity (in particular, the distances between the sources of raw materials, distribution and production facilities, and consumers). The transportation industries are not passive participants in the market, however. If they can reduce the cost of transportation—by adopting new technologies or finding other ways to increase productivity, for example—they may be able to increase demand for their services. Indeed, the historical progression of trade from local, to regional, to national, to international was aided to a large extent by reductions in the cost of transportation.¹⁷

The Role of Freight Railroads Today

Railroads carry about 47 percent of intercity freight traffic (excluding pipelines and airfreight) in the United

15. *Ibid.*, p. 91.

16. A ton-mile is the measure of one ton of freight transported the distance of one mile.

17. Improved transportation at a lower cost has enabled producers to reap economies of scale in production and advantages from specialization.

States, measured in ton-miles, and about 30 percent, measured in tons.¹⁸ In 2003, they carried 1.8 billion tons of freight a total of about 1.6 trillion ton-miles.¹⁹ Because rail rates are generally lower than rates for trucking or air-freight, however, railroads take in only about 13 percent of intercity freight revenues—about \$36.6 billion in 2003.²⁰

Railroads carried shipments valued at \$320.5 billion in 2002. By comparison, during the same period, trucks transported shipments worth \$6.2 trillion, air carriers transported shipments worth \$279.5 billion, and water carriers transported freight worth \$90.9 billion.²¹ The value of freight rail shipments in 2002 represented 3.1 percent of gross domestic product (GDP) for that year; it was 10.7 percent of the nonservice (durable plus nondurable goods) portion of GDP.²² The value of rail shipments accounted for nearly 17 percent of the value of goods imported into and exported from the United States in 2002.²³

Rail transportation is particularly important to certain industries. About 70 percent of coal delivered to power

plants in the United States travels by rail, as do about 70 percent of all automobiles manufactured domestically.²⁴ Approximately 32 percent of grain shipments are transported by rail.²⁵ The chemical industry also relies heavily on railroads.

The railroad industry in the United States is dominated by two large carriers in the West, Union Pacific Railroad Company (UP) and BNSF Railway (formerly known as the Burlington Northern Santa Fe), and two in the East, CSX Transportation, Inc., and Norfolk Southern Railway. Those railroads plus three others—the Grand Trunk Corporation (a unit of the Canadian National Railway Company that includes Grand Trunk Western, Illinois Central, Wisconsin Central, and smaller railroads), Soo Line Railroad Company (a unit of Canadian Pacific Railway), and Kansas City Southern Railway Company—constitute the set of Class I railroads, as defined by the Surface Transportation Board, that are the focus of this paper.²⁶ Data for Class I railroads closely track data for the entire industry. The use of data for Class I railroads or all railroads in this paper reflects whichever are more readily available.

18. Pipelines are not generally in direct competition with railroads, nor is air freight. Air freight accounts for a very small proportion of freight tonnage and ton-miles. Ton-mile data are from Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2005*, Table 1-46a, available at www.bts.gov/publications/national_transportation_statistics/2005/index.html. Tonnage data are from Rosalyn A. Wilson, *Transportation in America*, 19th ed. (Washington, D.C.: Eno Transportation Foundation, 2002), p. 44.

19. Association of American Railroads, *Railroad Facts, 2004 Edition* (Washington, D.C.: AAR, October 2004), pp. 27-28.

20. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2005*, Table 3-18, available at www.bts.gov/publications/national_transportation_statistics/2005/index.html. The calculation used air freight data from the BTS' *Air Profile* and Table 3-17 of *National Transportation Statistics*.

21. Department of Transportation, *National Transportation Statistics 2005*, Table 1-52, available at www.bts.gov/publications/national_transportation_statistics/2005/index.html. These numbers double-count the value of goods carried by more than one mode.

22. Council of Economic Advisers, *Economic Report of the President* (February 2004), Table B-1.

23. *Ibid.*, Table B-24.

Trends in Freight Rail Transportation

Total freight traffic carried by all modes of transportation in the United States has been growing. Rail and intercity truck traffic, as measured in ton-miles, has risen steadily in recent years, while water transportation has declined (see Figure 1).

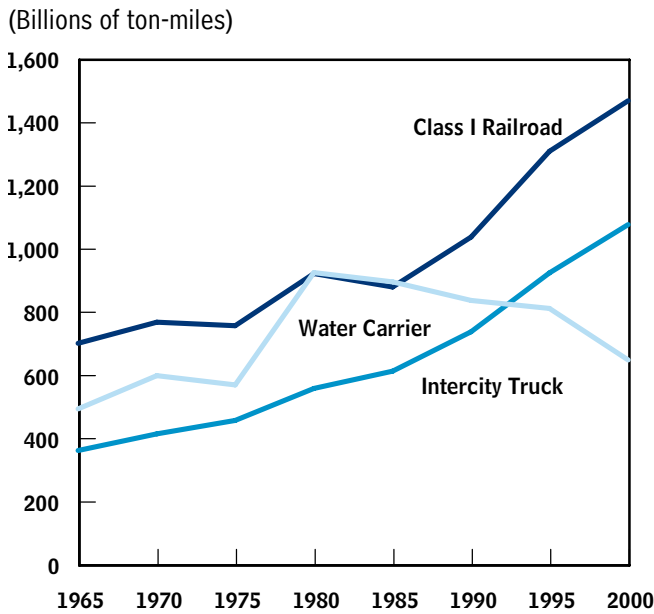
Railroad freight traffic has trended upward over the history of the industry, generally suffering small dips only in periods of recession. Railroads experienced a sharp increase in traffic in the 1990s: traffic jumped more than 50 percent between 1990 and 2003, rising from about 1.0

24. Association of American Railroads, *Economic Impact of U.S. Freight Railroads* (Washington, D.C.: AAR, November 2005), p. 2, available at www.aar.org.

25. Department of Agriculture, Agricultural Marketing Service, Transportation Services Branch, *Transportation of U.S. Grains: A Modal Share Analysis, 1978-2000* (October 2004), p. 10.

26. The STB defines Class I railroads according to a revenue threshold. For 2003, the threshold was more than \$277.7 million in annual revenues.

Figure 1.
Intercity Freight Traffic, 1965 to 2000



Source: Congressional Budget Office based on Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2005*, Table 1-46a.

trillion ton-miles to about 1.6 trillion ton-miles (see Figure 2).²⁷

Coal has long been the dominant commodity carried by rail in the United States. In 2004, it accounted for about 43 percent of the tons carried (see Figure 3) and about 20 percent of revenues of Class I railroads.²⁸ Coal traffic has trended upward over the past 10 years (see Figure 4 on page 8).

The principal sources of railroad growth over the past decade have been coal and intermodal (“miscellaneous mixed”) shipments.²⁹ Coal traffic (as measured in tons) rose about 37 percent from 1994 to 2003; in terms of

27. Association of American Railroads, *Class I Railroad Statistics* (Washington, D.C.: AAR, July 13, 2005), available at www.aar.org. These numbers include Class II and III railroad data. The Bureau of Transportation Statistics numbers used to compare railroads with other modes include only Class I data.

28. Association of American Railroads, *Class I Railroad Statistics*, p. 3.

29. Intermodal service refers to truck trailers and containers transported on railcars. “Miscellaneous mixed” shipments include those carried by boxcars and other types of equipment in addition to containers and trailers used in intermodal transportation.

revenue, however, it increased just 12 percent.³⁰ Intermodal shipments, which tend to be relatively high in value and can command higher rates, grew about 33 percent in tonnage and 46 percent in revenues from 1994 to 2003.³¹

Projections of Growth in Demand for Rail Transportation

Rail traffic is projected to continue to increase as the economy grows. The Department of Energy’s Energy Information Administration (EIA) projects rail growth of 1.7 percent annually, rising from about 1.6 trillion ton-miles in 2004 to nearly 2.4 trillion ton-miles in 2030.³²

The Energy Department’s interest in rail transportation derives primarily from its interest in the production and consumption of coal. The EIA projects an increase in the number of tons of coal consumed in the United States of about 62 percent between 2004 and 2030.³³ About 92 percent of coal consumption in 2004 was for the production of electricity.³⁴ The EIA projects Western coal production to increase to nearly 1.1 billion tons in 2030 from 627 million tons in 2004.³⁵ Most of that coal will have to be transported over distances for which trucking costs would be prohibitive and where water transportation is unavailable, so railroads will probably be called upon to fill the need for coal transportation.

The Federal Highway Administration (FHWA) has also developed a forecast of demand for freight transportation. That forecast, called the Freight Analysis Framework (FAF), focuses on tonnage, rather than ton-mileage, and

30. Association of American Railroads, *Railroad Ten-Year Trends, 1994-2003* (Washington, D.C.: AAR, 2004), pp. 45 and 47.

31. Ibid.

32. Department of Energy, Energy Information Administration, *Annual Energy Outlook 2006 (Early Release)*, Table 7, available at www.eia.doe.gov/oiaf/aeo/index.html.

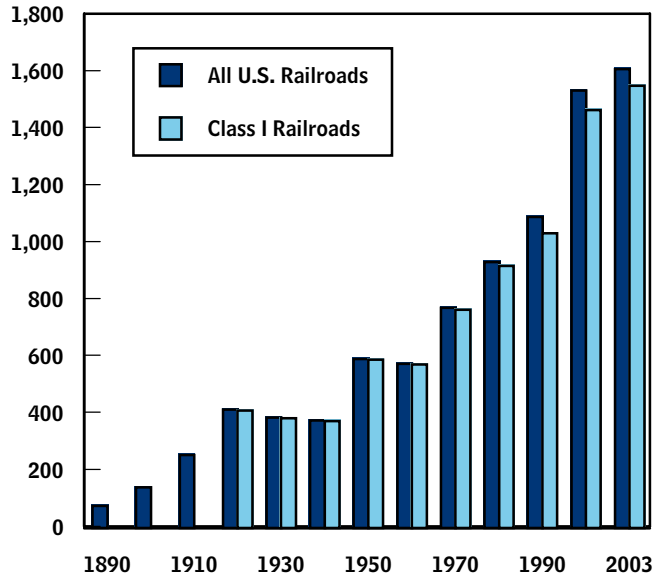
33. Ibid., Table 15.

34. EIA projected a decline to 84 percent in 2030.

35. Department of Energy, *Annual Energy Outlook 2006*, Table 15. Western coal generally has lower sulfur content, which makes it more attractive under current environmental laws. However, policies or technologies could change—such as finding that Western coal might cause other environmental damage or finding new technologies to remove sulfur more cheaply—that would shift the balance away from Western coal. That would have major effects on the coal-hauling railroads.

Figure 2. Freight Carried by U.S. Railroads, 1890 to 2003

(Billions of ton-miles)



Source: Congressional Budget Office based on Association of American Railroads, *Railroad Facts, 2004 Edition*, pp. 27 and 32; and Association of American Railroads, *Class I Railroad Statistics* (July 13, 2005), available at www.aar.org.

is for the years 2010 and 2020.³⁶ In the FAF forecast, freight tonnage in the United States (including imports and exports) will rise by nearly 70 percent between 1998 and 2020, increasing from 15.3 billion tons in 1998 to 25.8 billion tons in 2020.³⁷ Rail tonnage is projected to rise by about 55 percent, from 2.3 billion tons to 3.6 billion tons.³⁸ Rail's share of all freight traffic is projected to decline from 15.1 percent in 1998 to 13.9 percent in 2020.

36. American Association of State Highway and Transportation Officials, *Freight-Rail Bottom Line Report*, p. 50.

37. Federal Highway Administration, *Freight Analysis Framework* (October 2002), FHWA-OP-03-006(R), available at www.ops.fhwa.dot.gov/freight/documents/faf_overview.pdf. Information about the methodology is available at www.ops.fhwa.dot.gov/freight/documents/WebMeth/faf_db_derivation.pdf.

38. Rail's *domestic* tonnage is projected to rise by about 48.1 percent, from roughly 1.9 billion tons to about 2.8 billion tons.

In the FAF forecast for 2020, coal continues to dominate rail traffic, accounting for about 37 percent of tonnage (see Figure 5 on page 9). Trailing coal are chemicals, accounting for about 9 percent of rail tonnage; food and kindred products, with about 8 percent; and, with about 7 percent each, farm products, nonmetallic minerals, and a category called "freight all kind," which refers to general freight that might be carried in boxcars or intermodal containers or trailers.

Showing the greatest growth in rail tonnage between 1998 and 2020 are clay/concrete/glass/stone and food and kindred products, which are projected to more than double in volume (see Table 1 on page 10). General freight (freight all kind) and lumber and wood are projected to nearly double. Coal and chemicals are projected to grow by 28.5 percent and 75.5 percent, respectively.

Meeting Future Freight Transportation Demand: The AASHTO Report

The transportation demand of a growing economy can be met in various ways. The FHWA's Freight Analysis Framework projects that each mode will see an increase in the amount of traffic it carries. But both the inherent advantages of each mode and the public policies affecting them will have a bearing on the pattern of growth.

A recent report that has been influential in the debate over freight transportation policy is the *Freight-Rail Bottom Line Report*, published by the American Association of State Highway and Transportation Officials.³⁹ That report was motivated by concerns that highway capacity was increasingly being stretched to its limits. State transportation planners were interested in whether future freight transportation demand could be met more efficiently through a mix of highway and rail investments rather than focusing on highways. The *Bottom Line Report* made alternative assumptions about how the freight railroad industry might respond to growing demand, and it analyzed the implications for highway and other infrastructure needs.

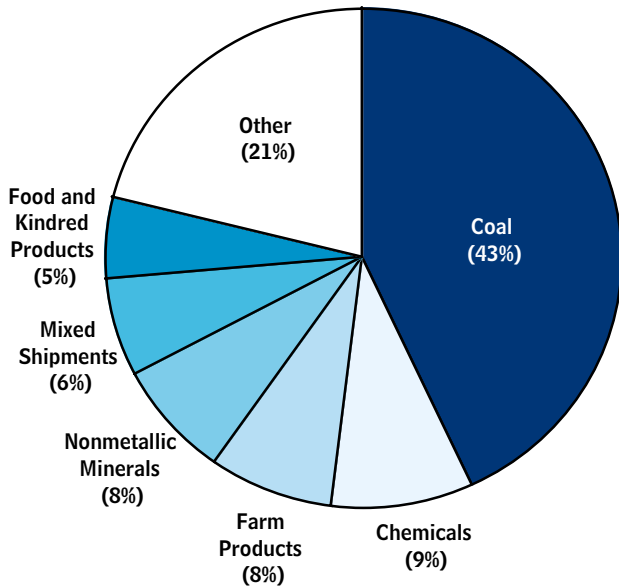
Using forecasts of freight transportation demand—principally proprietary forecasts of the Freight Analysis Framework—the *Bottom Line Report* estimated how much new highway capacity would be needed, and what

39. American Association of State Highway and Transportation Officials, *Bottom Line Report*.

Figure 3.

Composition of Class I Railroad Traffic, 2004

(Share of tons carried)



Source: Congressional Budget Office based on Association of American Railroads, *Class I Railroad Statistics* (July 13, 2005), available at www.aar.org.

it would cost, under each of four scenarios.⁴⁰ It estimated the benefits of rail investment in terms of cost savings to governments for building and maintaining additional highway capacity, to highway users (by reducing vehicle operating costs, congestion, and accidents), and to shippers (by lowering transportation costs).

For its “base-case” scenario, which assumed that railroads would invest enough to maintain their current share of traffic in each of three submarkets (carloads, unit trains, and intermodal service), the *Bottom Line Report* estimated that the railroad industry would need to invest between \$175 billion and \$195 billion over a 20-year period.⁴¹ The report concluded, “Railroads should be able to provide the majority of the funding needed (up to \$142 billion) from revenue and borrowing, but the remainder (up to \$53 billion, or \$2.65 billion annually) would have to come from other sources—including but not limited to loans, tax credits, sale of assets, and other forms of public-

sector participation.”⁴² The report also estimated that its aggressive-investment scenario, which assumed that railroads would make substantial investments to improve and expand service, would require between \$205 billion and \$225 billion over 20 years.⁴³

The *Bottom Line Report’s* cost and benefit estimates were intended more to be illustrative than to be quantitatively precise. The authors did not specify the timing of the costs and benefits and did not attempt to state net benefits in terms of present discounted value. Because the benefits are likely to come later in the time period than the costs, the estimates presented in the report are likely to overstate the net benefits. That is, in present-value terms, the net benefits would likely be less than the *Bottom Line Report* suggested. In that case, the capacity expansion needed to meet future demand might be less than the report indicates.

Rail traffic appears to be growing faster than the AASHTO report projected, underscoring the importance of addressing capacity issues but rendering the report more useful for its qualitative insights than for its quantitative estimates.

The Supply of Freight Rail Transportation

Various indicators can shed light on an industry’s ability to provide and expand service. In the case of the railroad industry, however, some of those indicators do not lead to definitive conclusions. Both capital stock and employment in the industry have declined over the long run, giving rise to concerns about the railroads’ willingness and ability to invest in additional capacity. But productivity has increased dramatically, enabling railroads to provide service with significantly fewer resources than were previously needed.

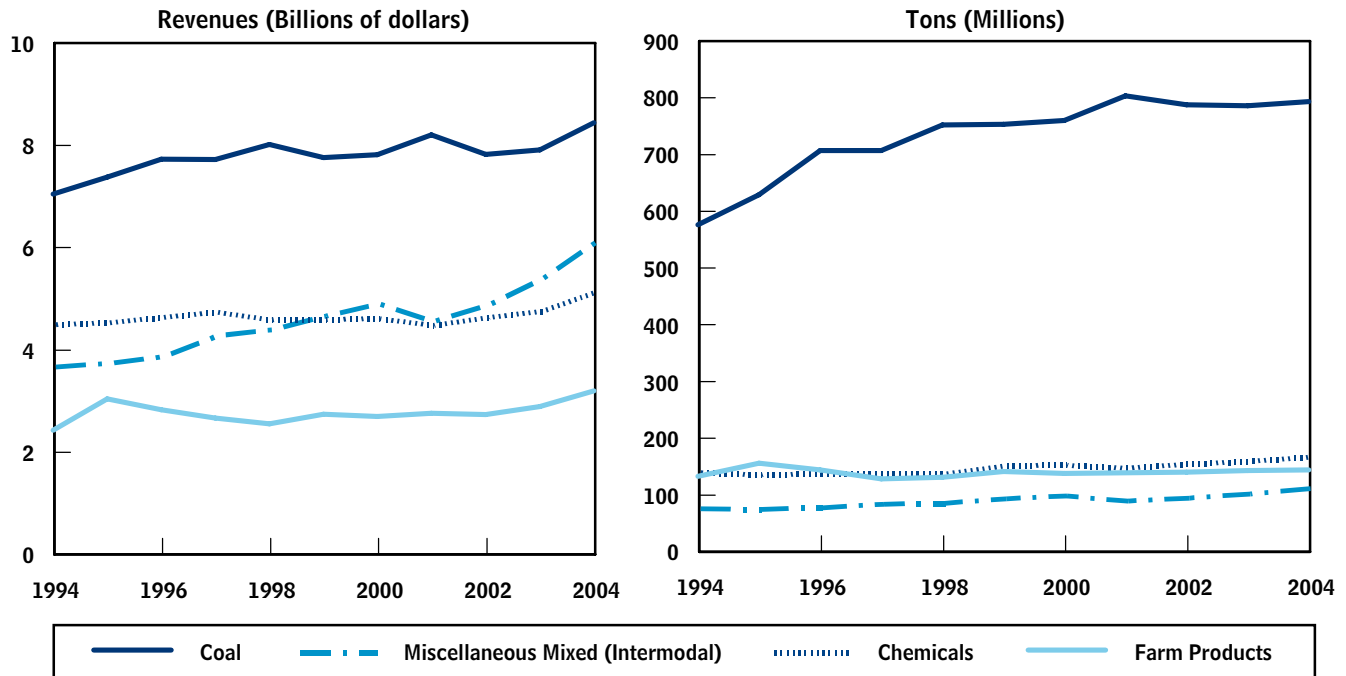
Because railroad capital is long-lived, interpreting the data on trends in investment can be difficult. Adjusting to changes in demand, the competitive environment, and government policies can take a long time. For most of the 20th century, federal regulation kept the railroad industry

40. *Ibid.*, p. 50.

41. *Ibid.*, p. 4.

42. *Ibid.*

43. *Ibid.*

Figure 4.**Freight Transported by U.S. Railroads, 1994 to 2004**

Sources: Association of American Railroads, *Railroad Ten-Year Trends, 1994-2003*, pp. 45 and 47; and Association of American Railroads, *Class I Railroad Statistics* (July 13, 2005), available at www.aar.org.

in the United States in a disequilibrium that was characterized by excess capacity. That was particularly true in the East and Midwest, where numerous competing railroads had sought to capture larger shares of the market by building ahead of demand.⁴⁴ The overcapacity was exacerbated by regulatory controls that prevented railroads from shedding underused and unprofitable lines.

Once the Staggers Rail Act of 1980 eased regulation of abandonment and made withdrawing from unprofitable service easier, the major (Class I) railroads began to abandon lines or to transfer them to short-line railroads that could meet the needs of local markets more efficiently. In addition, mergers between railroads reduced redundant capacity. The number of miles of track owned by Class I railroads dropped from nearly 271,000 in 1980 to

169,000 in 2003.⁴⁵ The number has hovered around 170,000 over the past few years, suggesting that most of the line-capacity adjustments made possible by the Staggers Act have occurred.

At the same time, the number of train-miles has grown, especially in recent years. That has led to a greater intensity of use of tracks (see Figure 6 on page 11). Such growth helps explain why some tracks are becoming increasingly congested, a factor that has contributed to concern about the railroads' ability to meet future demand. As the number of trains per mile of track has increased, the average speed—a measure that experts often use as an indicator of railroads' performance—has declined; it is now lower than it has been since the early 1980s, except for the turbulent 1997-1998 period following the merger of Union Pacific and Southern Pacific.

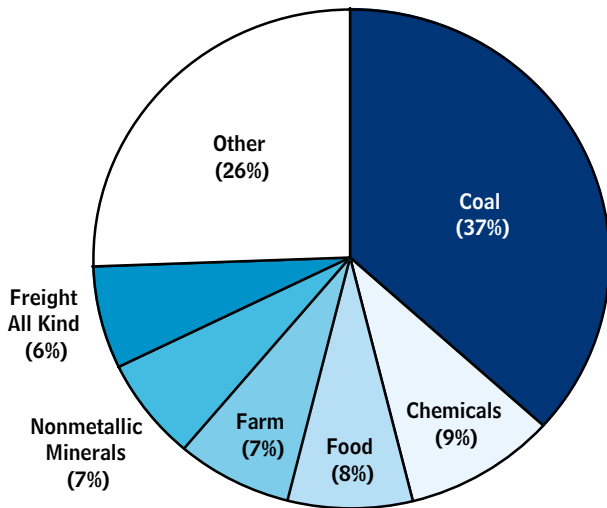
Some observers believe that the mid-1990s marked a turning point for the railroad industry. After disinvesting for years to rationalize their systems, railroads increas-

44. Transportation Research Board, *Freight Capacity for the 21st Century*, pp. 59-60. In the South, the degree of overcapacity was restrained by the destruction of tracks during the Civil War and the depressed state of the economy for decades following the war. In the West, the combination of later development of the economy and the cost of building track in remote locations that were subject to harsh conditions constrained investment in track.

45. Association of American Railroads, *Railroad Facts*, p. 45.

Figure 5.
Distribution of Rail Traffic in 2020 as Projected by the Freight Analysis Framework

(Share of tons carried)



Source: Congressional Budget Office based on data from Federal Highway Administration, *Freight Analysis Framework*, available at www.ops.fhwa.dot.gov/freight/documents/faf_overview.pdf.

ingly encountered situations where they could have sold more transportation services if they had had more capacity.⁴⁶ Other observers think the turning point at which the railroads became able to sustain increases in rates across a wide range of traffic came more recently.⁴⁷

Predicting trends is difficult, especially during a period of change. Recent activity suggests that the railroads will continue to expand capacity. Whether growth in supply will keep pace with growth in demand is an open question. This section presents data on trends in measures of inputs, costs, and productivity in the railroad industry.

46. Transportation Research Board, *Freight Capacity for the 21st Century*, p. 61, citing Daniel Machalaba, "Railroads' Big Outlays on Infrastructure Are Questioned," *Wall Street Journal*, April 30, 1998, p. B4.

47. See, for example, Statement of the Department of Transportation before the Surface Transportation Board in Ex Parte No. 658, the 25th Anniversary of the Staggers Rail Act of 1980 (October 12, 2005), available at www.stb.dot.gov.

Railroad Costs

Railroads need a number of inputs to produce transportation services: right-of-way, tracks, locomotives, freight cars, labor, and fuel.⁴⁸

Tracks and Equipment. Railroads are a capital-intensive industry: the ratio of capital to output is high relative to that of most other industries. That makes capital investment a key indicator of the industry's ability to meet demand. As mentioned earlier, the number of miles of track has declined.

The number of locomotives and freight cars in service is also an indicator of capital stock. Following a decline in the number of locomotives in the period from 1955 to 1990, railroads began adding to their fleets (see Figure 7 on page 12).⁴⁹ The number of freight-carrying cars has followed the same general pattern. Over long periods of time, however, the number of locomotives and cars does not tell the full story of capacity because newer equipment can often handle much larger loads. The number of railcars owned by shippers and other nonrailroad companies has climbed steadily over the post-World War II period (except for a slight decline from 2002 to 2003).⁵⁰

Real capital expenditures by Class I railroads have fluctuated over time. Real capital spending on roadways and structures has trended upward over the past decade, while real spending on equipment has been more volatile (see Figure 8 on page 13). Spending on freight cars has always been cyclical.

Because rail investments are generally long-lived, short-term fluctuations are less important than long-term trends as indicators of railroads' plans and capabilities. Investment may rise and fall from year to year because of short-term factors such as interest rates or alternative investment opportunities.

48. Railroads need land for rights-of-way, but a lack of land does not appear to have been a constraining factor. Where railroads currently have single tracks, they generally have a wide enough right-of-way to allow room for a second track. If necessary, they have access to the right of eminent domain to acquire land.

49. See Association of American Railroads, *Railroad Facts*, pp. 49 and 51, for data on locomotives and freight cars, respectively.

50. *Ibid.*, p. 51.

Table 1.

Freight Rail Traffic, 1998 and 2020 (as Forecast by the Freight Analysis Framework), by Major Commodity Group

(In order of growth rate)

	Freight Rail Traffic in 1998 (Millions of tons)	Freight Rail Traffic Projected for 2020 (Millions of tons)	Growth, 1998-2020 (Percent)	Growth, 1998-2020 (Millions of tons)
Clay/Concrete/Glass/Stone	53.2	121.8	128.9	68.6
Food and Kindred Products	103.5	228.1	120.3	124.6
Freight All Kind	96.4	187.3	94.3	90.9
Lumber/Wood	62.3	119.5	91.9	57.2
Waste/Scrap Materials	43.3	76.9	77.7	33.6
Chemicals/Allied	153.2	268.9	75.5	115.6
Pulp/Paper/Allied	46.7	79.1	69.3	32.4
Primary Metal	62.7	101.2	61.5	38.6
Transportation Equipment	45.5	63.7	40.1	18.3
Petroleum/Coal	45.4	63.3	39.4	17.9
Farm	153.9	208.4	35.4	54.5
Coal	829.6	1,065.7	28.5	236.1
Nonmetallic Minerals	151.1	192.9	27.7	41.8
Metallic Ores	76.0	57.0	-25.0	-19.0

Source: Congressional Budget Office based on projections from Federal Highway Administration, *Freight Analysis Framework*, available at www.ops.fhwa.dot.gov/freight/documents/faf_overview.pdf.

Labor. The number of workers employed in the railroad industry has dropped precipitously over the past half century, declining roughly 80 percent, from about 1.2 million in 1955 to 223,000 in 2003 (see Figure 9 on page 14).⁵¹ Yet, in 2004, the Class I freight railroads added about 3,000 workers to their payrolls.⁵² That upturn is expected to continue, at least in the short run.

In 2003, the total wage bill was about \$9.6 billion, with average wages of nearly \$62,000 per year, or \$23.40 per hour.⁵³ Labor costs, including benefits, amounted to about 36 percent of operating expenses in 2004.

51. Association of American Railroads, *Railroad Facts*, p. 56. These numbers include employees associated with passenger rail service. The number of employees of Class I railroads (including Amtrak, the passenger carrier) fell by about 84 percent during the 1955-2000 period and by about 28 percent during the 1990-2003 period.

52. Association of American Railroads, *Class I Railroad Statistics*, p. 1.

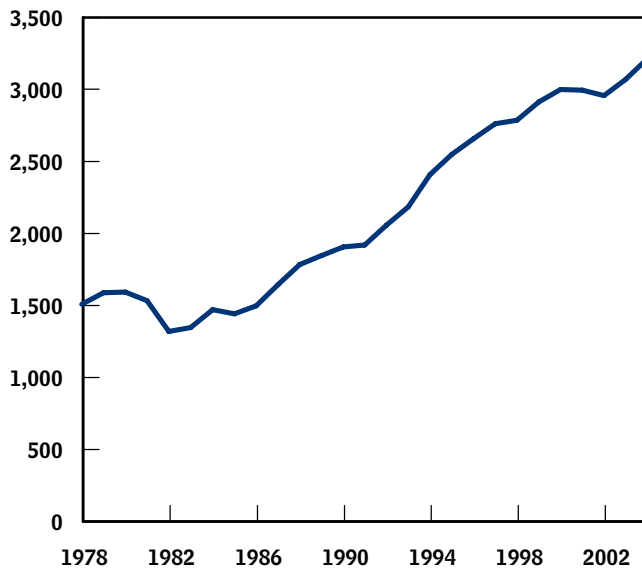
53. Association of American Railroads, *Railroad Facts*, p. 56.

Fuel. In 2003, the Class I railroads consumed more than 3.8 billion gallons of diesel fuel, at a cost of about \$3.4 billion (about 89 cents per gallon).⁵⁴ Fuel costs accounted for about 10.6 percent of operating expenses in 2003. Fuel efficiency has been rising, from about 235 ton-miles per gallon of diesel in 1980 to about 410 ton-miles per gallon in 2004.⁵⁵ The Oak Ridge National Laboratory reports that railroads have better fuel efficiency than trucks or water carriers do, using 345 British thermal units (Btus) per ton-mile, compared with 3,476 for trucks and 471 for domestic waterborne commerce.⁵⁶

54. *Ibid.*, p. 61.

55. Association of American Railroads, "Economic Impact of U.S. Freight Railroads" (November 2005), p. 3, available at www.aar.org.

56. Stacy C. Davis and Susan W. Diegel, *Transportation Energy Data Book: Edition 24* (Oak Ridge, Tenn.: Oak Ridge National Laboratory, December 2004), p. 2-17, available at cta.ornl.gov/data/Index.shtml.

Figure 6.**Train-Miles per Track-Mile for Class I Railroads, 1978 to 2004**

Source: Congressional Budget Office based on Surface Transportation Board, *Statistics of Class I Freight Railroads in the United States* (compilation of various years by Louis S. Thompson), available at www.stb.dot.gov.

Railroad Productivity

Historical data on railroads' spending on capital and other inputs do not, by themselves, indicate whether the railroads' ability to provide more transportation services is rising or declining. The railroad industry has experienced substantial improvements in productivity in recent years, which have enabled it to provide more service with smaller amounts of capital and fewer workers.

Railroad productivity growth outpaced that of the private business sector of the U.S. economy in the period from 1958 to 1999 (see Figure 10 on page 15).⁵⁷ Both multifactor productivity and labor productivity (the latter measured in output per hour of work) have grown sharply, especially in the post-1980 period when railroads could take advantage of reduced regulatory constraints following the Staggers Rail Act.

57. Bureau of Labor Statistics, Office of Productivity and Technology, *Historical Industry Multifactor Productivity Indexes*, available at <ftp://ftp.bls.gov/pub/special.requests/opt/dipts/indhimfp.txt> (1958-1987) and <ftp://ftp.bls.gov/pub/special.requests/opt/dipts/indmfp.txt> (1987-1999).

Railroads have made a number of technological advances that have spurred productivity growth. They have improved tracks by introducing concrete crossties and stronger steel. New freight cars generally can carry heavier loads than old ones can, and new types of equipment, such as cars designed to carry containers more compactly, have made intermodal service more efficient. Locomotives have become more powerful, more reliable, and more fuel-efficient. New signaling and sensing technologies have also contributed to productivity increases.

In addition, railroads have become more productive by changing the way they operate. They have encouraged shippers to aggregate their shipments so that, for example, they ship many carloads at the same time instead of just one or a few. That approach reduces the amount of railcar switching in freight yards, a process that can lead to delays, routing errors, and damage to shipments. Railroads have reduced car-switching delays and streamlined their operations by adopting a variety of operations-research techniques.

Financing Railroad Investment

As demand increases, the railroads' ability to generate profits from which to finance new investments will be critical. Profits are key to increasing capacity because they provide both the incentives and the means to make new investments. Much of the railroad industry's funding for investment comes from retained earnings.

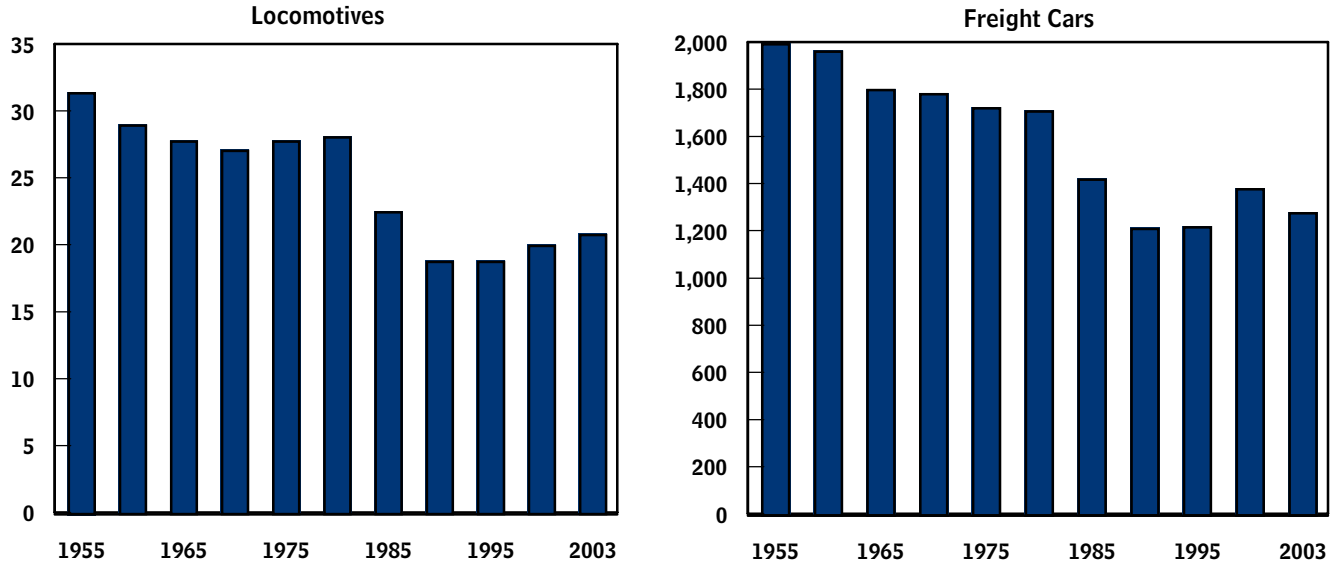
As indicated in the previous section, railroads have cut costs and increased productivity substantially. The other major element in generating profits is the ability to sustain or raise prices. Raising rates presents the railroads with a dilemma: if they raise rates too much on certain commodities, they may risk reregulation of rates.

Prices

The prices (or rates) that railroads charge their customers feed directly into revenues, which affect profits and funding for new investment. The railroads' pricing experience is not entirely clear; different sets of data seem to tell different stories about whether rates have been rising or falling. Price indexes generated by the Department of Labor's Bureau of Labor Statistics (BLS) generally show railroad rates to be increasing, but the Surface Transportation Board, the Government Accountability Office (GAO), and others have done analyses that suggest declining rail rates over the long run.

Figure 7.**Railroad Equipment in Service, 1955 to 2003**

(Thousands)



Source: Association of American Railroads, *Railroad Facts*, 2004 Edition, pp. 49 and 51.

Producer Price Indexes. The BLS producer price index (PPI) for line-haul railroads indicates a steady rise from 1969 to 2004 (see Figure 11 on page 16). That index generally tracks a commonly used benchmark, the PPI for finished goods. The “line-haul railroad” series includes passenger service, but that is a small fraction of the total. Beginning in December 1996, BLS published PPIs for the two major components of freight rail service, carloads and intermodal service (see Figure 12 on page 17 for those indexes and the finished-goods index). Both carload and intermodal prices trend upward in the BLS series.

Revenue Per Ton-Mile. Another way of assessing changes in railroad rates is to examine revenue per ton-mile, a measure that serves as a proxy for rates. Overall revenue per ton-mile has declined from about 2.9 cents in 1980 to about 2.3 cents in 2003.⁵⁸ That aggregate measure does not take into account changes in the composition of traffic, however. It could decline even if rates were rising if at the same time the mix of shipments was shifting toward higher percentages of those with lower rates.

The Surface Transportation Board has created rail rate indexes based on revenue per ton-mile that take account of changes in the composition of traffic. The index shows a decline in rates, measured in revenue per ton-mile, over the period between 1984 and 1999, the most recent year available (see Figure 13 on page 18). When that index is adjusted for inflation using the GDP deflator, the decline is more pronounced (see the second panel of Figure 13 on page 18).

The STB has also calculated more-detailed indexes of rates by traffic type and by geographic location. It found that nominal rail rates in the East fell 13.2 percent between 1984 and 1999, and rates in the West fell 24.7 percent during that period.⁵⁹ Adjusted for inflation, Eastern rates fell 40.7 percent, and Western rates fell 48.8 percent.⁶⁰

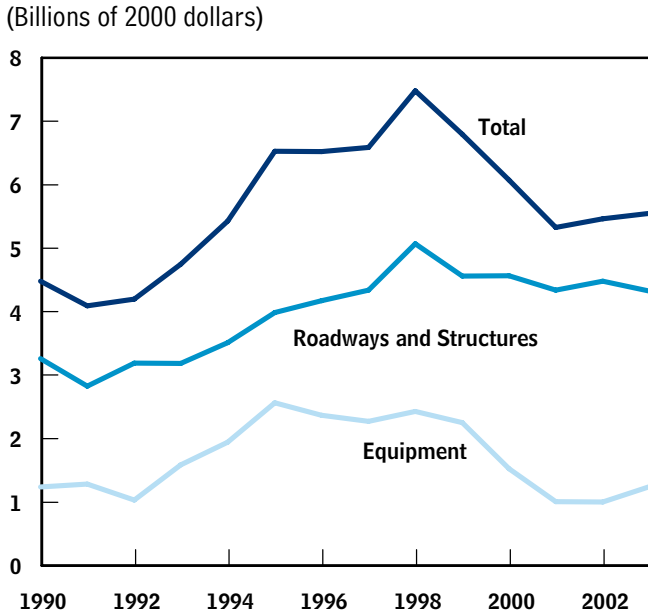
As for individual commodities, the STB found that Western coal rates experienced an average annual inflation-adjusted decline of 5.8 percent over the 1984-1999

58. Association of American Railroads, *Railroad Facts*, p. 30.

59. Surface Transportation Board, *Rail Rates Continue Multi-Year Decline* (December 2000), p. 5, available at www.stb.dot.gov.

60. Ibid.

Figure 8.
Capital Expenditures of Class I Railroads, 1990 to 2003



Source: Congressional Budget Office based on Association of American Railroads, *Railroad Facts*, 2004 Edition, p. 44.

period.⁶¹ Eastern coal rates, in real terms, dropped about 3.9 percent annually over that period. Real rates for farm products in the West dropped 3.2 percent annually on average, while those in the East dropped 2.7 percent. Inflation-adjusted rates on chemicals in the West fell 3.2 percent annually, while those in the East fell 3.5 percent.⁶²

The STB index uses data on revenues and ton-mileage from its Carload Waybill Sample, which is drawn from bills of lading (with detailed data about individual shipments) submitted by the railroads. It eliminates bias associated with changes in the composition of rail traffic by weighting each commodity group’s rate change by its share of revenue.⁶³

61. *Ibid.*, p. 21. The STB found, for example, that railroads received \$14.75 for hauling a ton of Western coal an average of 807 miles in 1984 but received only \$10.11 for hauling a ton of Western coal 922 miles in 1999, with no adjustment for inflation. (*Ibid.*, p. 7.)

62. *Ibid.*, p. 21.

63. *Ibid.*, p. 6.

The Government Accountability Office has examined the STB’s Carload Waybill Sample and has generally agreed that rates on most rail traffic have been declining.⁶⁴ Coal rates, as measured in real revenue per ton-mile, drifted lower in most markets between 1990 and 2000, although within that period, there were notable upticks in the Central Appalachia-to-Orlando market and the Central Appalachia-to-Norfolk market.⁶⁵ GAO found that real rates on grain trended gently downward during that period, although some wheat and corn markets experienced increases in some years.⁶⁶ Rates on chemicals fluctuated but were lower in 2000 than in 1990 for most of the markets on which GAO reported.⁶⁷

The STB’s and GAO’s analyses take more time to prepare than the BLS indexes. BLS publishes preliminary estimates soon after the end of each month. Those estimates are subject to revision, however, within a few months’ time, and sometimes the revisions are large. For example, preliminary numbers for fall 2004 indicated slight increases in rates on intermodal service, rising from an index number of 110.2 in September to 111.3 in October, 112.0 in November, and 113.5 in December. Final numbers (as of January 2006) show rates in that period dropping from 110.2 in September to 104.1 in October and then rising gradually to 105.7 in November and 105.9 in December.

Transportation researchers have done additional work that supports the view that rail rates have been in a long-term decline.⁶⁸ Aggregate measures indicating that out-

64. GAO has statutory authority to view confidential business information in the sample that is ordinarily masked when the data are made available to the public. General Accounting Office (now known as the Government Accountability Office), *Railroad Regulation: Changes in Freight Railroad Rates from 1997 through 2000*, GAO-02-524 (June 2002) and *Railroad Regulation: Changes in Railroad Rates and Service Quality Since 1990*, GAO/RCED-99-93 (April 1999).

65. General Accounting Office, *Railroad Regulation: Changes in Freight Railroad Rates from 1997 through 2000*, p. 13.

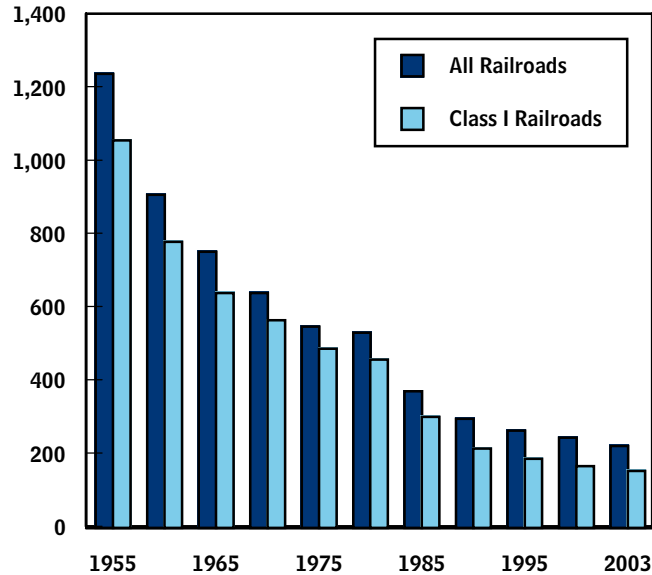
66. *Ibid.*, pp. 15-20.

67. *Ibid.*, pp. 39-40.

68. For example, see Scott M. Dennis, “Changes in Railroad Rates Since the Staggers Act,” *Transportation Research*, Part E, vol. 37 (March 2001), pp. 55-69; and John Bitzan and others, *The Differential Effects of Rail Rate Deregulation: U.S. Corn, Wheat, and Soybean Markets*, prepared for the Agricultural Marketing Service, U.S. Department of Agriculture (June 2003).

Figure 9.**Railroad Employment, 1955 to 2003**

(Thousands of workers)



Source: Congressional Budget Office based on Association of American Railroads, *Railroad Facts, 2004 Edition*, p. 56.

Note: Includes passenger rail and other railroad-related employment.

put has risen while revenues have remained relatively steady also support the conclusion that overall rates have fallen. It is unclear why the numbers from the BLS and STB seem to tell different stories (see Figure 14 on page 19 for a comparison of the BLS and STB indexes).

The railroad industry has shifted some costs to shippers in several ways. By encouraging shippers to combine shipments into larger loads (for example, multiple carloads instead of single carloads), the railroads can cut their own costs, but doing so imposes greater costs on shippers, which must hold larger inventories as a result and may have to invest in facilities or equipment capable of handling larger shipments. In addition, more shippers are bearing the cost of investing in their own railcars.⁶⁹ The STB estimates that added costs for shippers are small, however, when compared with the amount of money shippers have saved as a result of declines in rates (as reflected in revenue per ton-mile).⁷⁰

69. In 1980, about one-quarter of freight cars in service were owned by shippers and car companies; in 2003, more than half were.

Pricing Flexibility, Regulation, and Contracts. Rail rates are more flexible now than they were before passage of the Staggers Rail Act in 1980. Today, market conditions are stronger determinants of prices than regulation. If freight volumes rise relative to capacity, the pricing power of railroads should increase. For freight that could be handled by truck, the railroads' primary concern would be losing business to truckers. For freight that has fewer alternative means of transportation, however, the railroads may decide to moderate rate increases so as not to risk reregulation.

The Surface Transportation Board has authority to regulate rates on traffic for which certain conditions are met. Rates that are potentially subject to regulation are those that are available to shippers as part of railroads' "common-carrier obligation."⁷¹ Common-carrier rates are subject to maximum-rate regulation only where the STB finds the existence of market dominance by a railroad. To make a finding of market dominance, the STB must determine that there is no effective competition from other railroads or other modes of transportation for the traffic in question and that the revenues from that traffic are not less than 180 percent of the railroad's variable cost of providing the service.⁷²

Although individual contracts between railroads and shippers can be advantageous to both parties, they limit rate flexibility in the short run.⁷³ Because the terms of contracts are not made public, it is not known what proportion of rail traffic is subject to contracts and the length of those contracts. GAO estimated that about 70 percent of rail traffic in 1997, measured in tons, moved under

70. Surface Transportation Board, *Rail Rates Continue Multi-Year Decline*, p. 4.

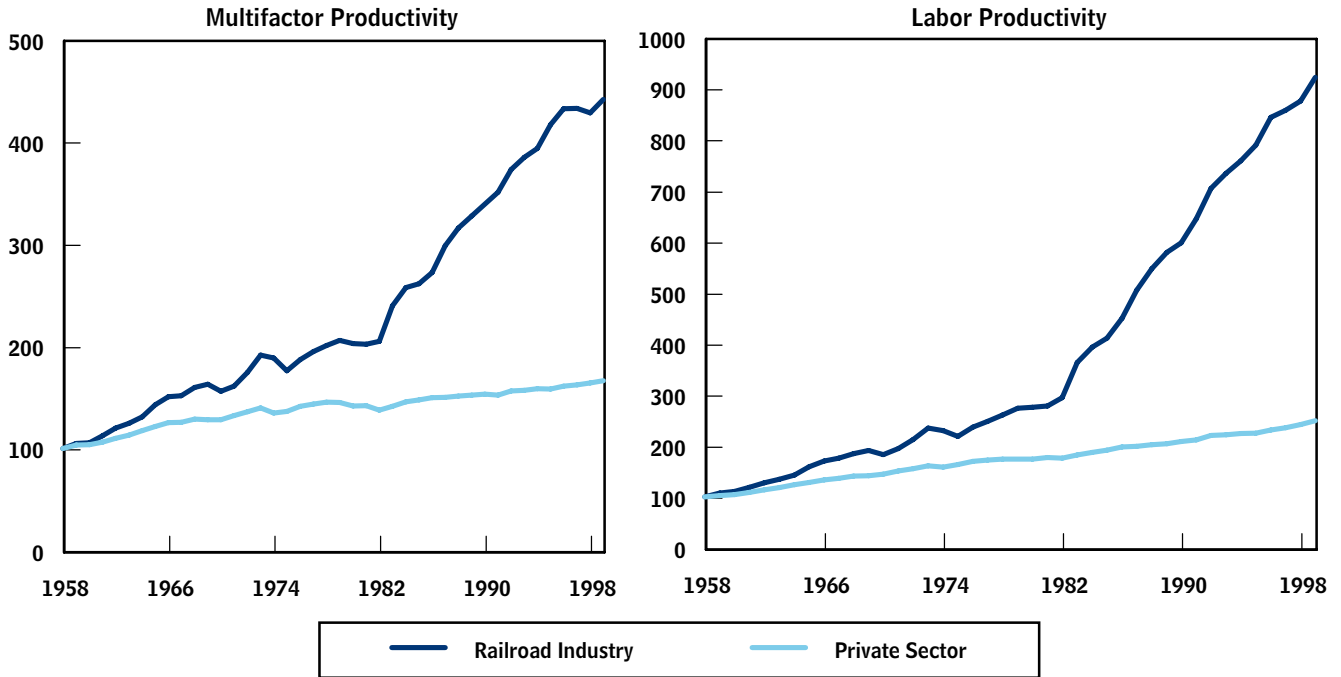
71. Common-carrier rates are available to all shippers on an equal basis. They contrast with contract rates, which result from agreements between a carrier and a shipper.

72. The Staggers Act encouraged the Interstate Commerce Commission (the STB's predecessor) to exempt broad categories of rail traffic for which it determined that regulation was not necessary to protect shippers from the abuse of market power. The ICC exempted substantial amounts of rail traffic, such as all boxcar and intermodal shipments, that are competitive with trucks.

73. Contract rates are not subject to STB regulation, but the terms of contracts for certain agricultural commodities must be filed with the STB.

Figure 10.
Productivity Growth, 1958 to 1999

(Index, 1958=100)



Source: Congressional Budget Office based on Bureau of Labor Statistics, *Multifactor Productivity Series*.

long-term contracts.⁷⁴ The percentage of traffic under contract has probably declined since then as some coal and agricultural movements have shifted to common-carrier rates. The average length of contracts has also shortened, as railroads and shippers reportedly have been less willing to make commitments with long durations.⁷⁵

In 2004, the railroads were able to raise rates for some traffic to adjust to changes in market conditions.⁷⁶ That experience illustrates how the railroads have become freed

from many of the rate-making constraints they once faced.

Profitability

The legacy of regulation has affected profitability in the railroad industry. When the Staggers Rail Act was passed in 1980, the railroads had excess track that was not yielding economic returns. Over the years, they have shed a number of low-volume spurs and focused on routes with more traffic and higher expected returns. Through cost-cutting and other measures, the railroad industry was able to improve net railway operating income in the late 1990s and early 2000s; it fluctuated between \$3.6 billion (1998) and \$4.3 billion (1996).⁷⁷

Still, the industry says that its investments are not generating enough of a return to meet the “regulatory cost of

74. General Accounting Office, *Rail Regulation: Current Issues Associated with the Rate Relief Process*, GAO/RCED-99-46 (February 1999), pp. 3 and 16. Before the Staggers Act, contract rates were used infrequently because of uncertainties about their legal status.

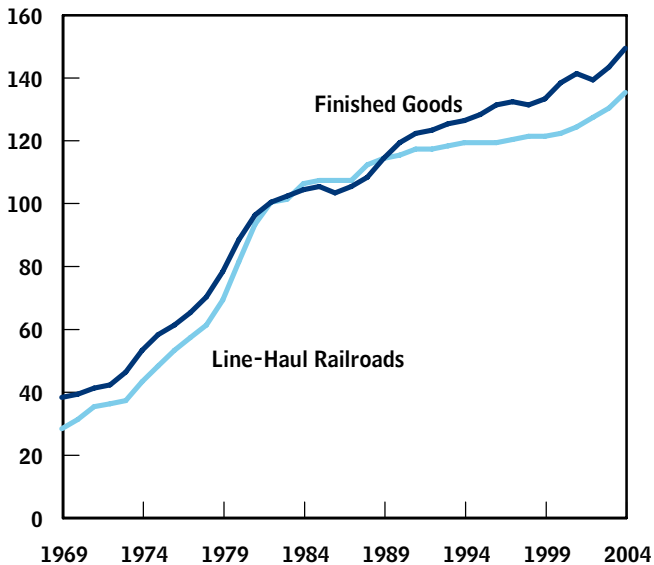
75. Contracts for coal shipments negotiated in the first few years after the Staggers Act went into effect reportedly were for periods as long as 20 years, as electric utilities and railroads sought to lock in rates and service levels. In recent years, as both railroads and electric companies have been buffeted by regulatory and market changes, they have been more reluctant to enter into such lengthy contracts.

76. Congressional Budget Office, *Freight Rail Transportation, A Review of the 2004 Experience*, pp. 9-10.

77. Association of American Railroads, *Railroad Facts*, p. 17.

Figure 11.**Producer Price Indexes, 1969 to 2004**

(Index, 1982=100)



Source: Congressional Budget Office based on Bureau of Labor Statistics' producer price indexes for line-haul railroads (including passenger service) and finished goods.

capital," as estimated by the Surface Transportation Board.⁷⁸ The STB annually estimates that measure, which is derived from the costs of debt and equity of the major railroads. The railroads' rate of return on net investment has consistently been below the regulatory cost of capital (see Figure 15 on page 20). According to the chairman of CSX, the railroads "are hindered as they compete with the Fortune 1000 for investment dollars as they fail, year-in, year-out, to meet their cost of capital."⁷⁹

The fact that railroads have been able to make some new investments in capacity indicates that those investments are valued highly enough to bring an adequate return. Older, less profitable investments may depress a railroad's overall return on investment. That measure, therefore, does not fully indicate whether a new, promising investment can be financed.

78. Association of American Railroads, *Railroad Profitability* (August 2004), available at www.aar.org.

79. Michael J. Ward, "CSX Transportation, Inc.—Fall Peak Planning," letter to Roger Nober, Chairman, Surface Transportation Board, in response to Nober's letter asking Class I railroads how they intended to meet fall peak demands (August 3, 2004), p. 2.

Another measure of profitability is the rate of return on railroad shareholders' equity, which has been roughly in the 8 percent to 9 percent range in recent years (but which declined to 6.65 percent in 2003). That return has generally fallen short of returns in manufacturing and a composite industry index. Over the past five years, however, the stock prices of the four largest railroads have outperformed the Standard and Poor's 500 Index.

In summary, railroads have incentives to make investments that are likely to yield adequate returns—that is, returns that exceed the cost of capital. The present value of the benefits of an investment to a railroad must exceed the present value of its costs.⁸⁰ One would expect railroads to have menus of possible projects and to choose the investments with the greatest returns first, then move down the priority list until the cost of capital no longer is covered by the investment return. It appears that railroads have been able to generate enough profits to finance some investments and attract new capital. The prospect of future profitability is an open question, however.

Factors That Might Affect Railroad Investment

Several factors could affect the railroad industry's decisions about investing in infrastructure. The central thread tying them together is the proposition of a "non-level playing field," that is, that the railroad industry faces higher costs or other obstacles that competing industries—truckers and water carriers—do not face. Railroads provide their own infrastructure, whereas their competitors do not. Furthermore, railroads are subject to several industry-specific laws. In addition to the vestiges of economic regulation that remain under the Interstate Commerce Act, the railroad industry has its own set of laws covering such matters as retirement, unemployment insurance, job protection following mergers, the resolution of labor disputes, workers' compensation, and bankruptcy.

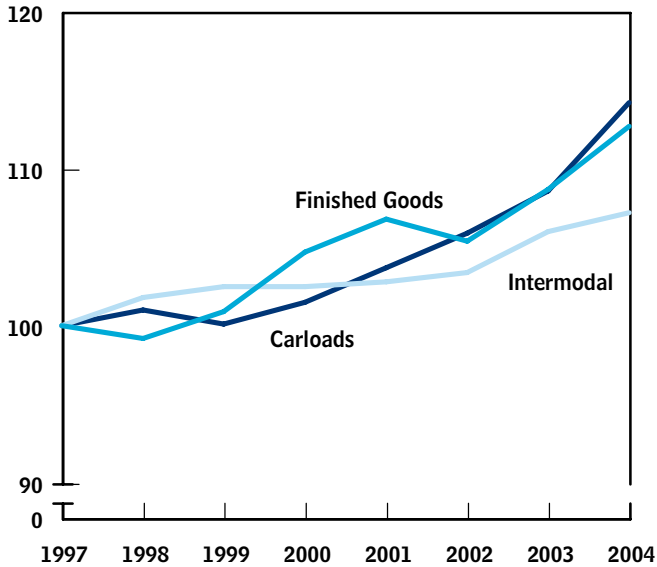
Ownership of Infrastructure

Railroads differ from other modes of transportation in the United States in that they own and maintain their own infrastructure—rights-of-way, tracks, signaling equipment, and so forth. In contrast, governments

80. If there are benefits external to a railroad, it may not have the incentive to make the investment.

Figure 12.
Producer Price Indexes, 1997 to 2004

(Index, 1997=100)



Source: Congressional Budget Office based on Bureau of Labor Statistics' producer price indexes for rail carloads, rail intermodal service, and finished goods.

provide the infrastructure—highways and inland waterways, including locks and dams on rivers—for the railroads' primary competitors. That institutional arrangement has implications for investment.

Railroads Pay the Full Cost of Their Infrastructure.

Current user-tax policies appear to tilt the playing field in favor of the trucking and water carrier industries. Although truckers and barge operators pay taxes that cover some of the costs of the infrastructure, they do not cover all of the costs incurred by governments. At the federal level, the Federal Highway Administration estimates that large trucks pay in taxes only about 50 percent to 80 percent of the costs attributed to them.⁸¹ Barge operators on the inland waterways pay taxes that cover only about 20 percent of the amount the Corps of Engineers spends on navigation projects.⁸² In contrast, the railroads pay for their rights-of-way and infrastructure and often must pay

local taxes on those investments as well. Those factors translate into lower private costs for truckers and water carriers and enable them to attract some freight shipments that could be carried at a lower total cost by the railroads. That encourages greater spending on highway and waterway construction than would be justified on economic grounds and leads to an inefficient use of the economy's resources.

Railroads Bear Risks Associated with Infrastructure Ownership.

Even if truckers and water carriers paid the full cost of their use of highways and waterways, they would not bear the risk of investing in highways or water projects in the wrong location. If a railroad lays track in anticipation of demand that ultimately does not materialize, the investment is sunk; it has little or no value. But if a state builds a highway in anticipation of demand that does not materialize, the state and its taxpayers bear the risk, not trucking companies. The immobility of capital makes it harder for the railroads to raise funds for investment.

Railroad-Specific Laws

For most of its history, the railroad industry in the United States has been governed by laws specific to that industry. Much of the difference in policy treatment derives from the railroad industry's place in history. Railroads were the first major companies to operate across state lines, and that motivated the passage of federal laws intended either to protect railroads from discriminatory treatment by the states and localities in which they operated or to protect shippers, passengers, and workers from abuses of market power.

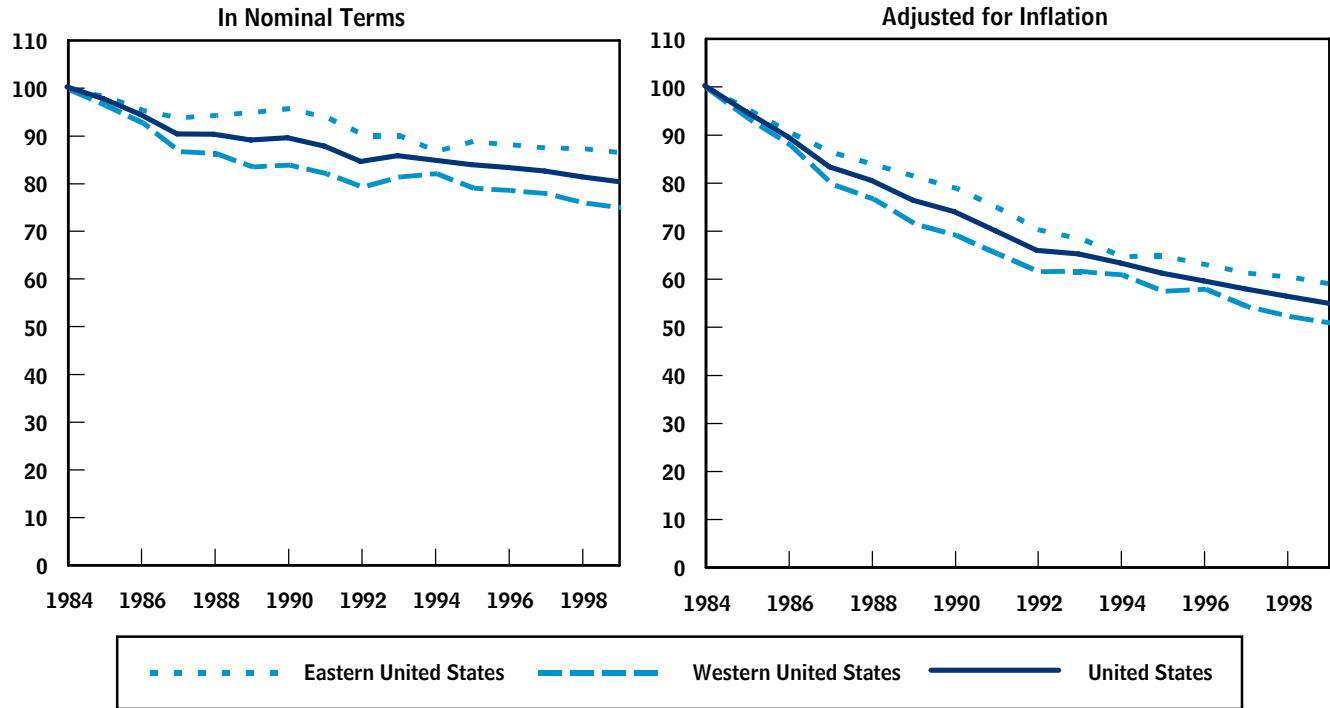
The Interstate Commerce Act, passed in 1887, created the first federal commission, the Interstate Commerce Commission (ICC), to oversee and regulate an entire industry. Over the next half century or so, additional federal laws were enacted that dealt specifically with railroad matters. The railroad industry was subject to its own retirement system, similar to but separate from Social Security; its own unemployment insurance system; its own system for compensating workers injured on the job; its own system for resolving labor disputes; special provisions to protect the jobs of workers following railroad mergers and abandonments; and special provisions in the bankruptcy code. Some of those laws may impose requirements on the industry that are more costly to meet than those of corresponding laws affecting most other industries, but the reverse could also be true. Assessing the

81. Department of Transportation, Federal Highway Administration, *Addendum to the 1997 Federal Highway Cost Allocation Study Final Report* (May 2000), Table 7.

82. The costs include both construction and operations and maintenance.

Figure 13.**Rail Rate Index, Measured in Revenue per Ton-Mile, 1984 to 1999**

(Index, 1984=100)



Source: Congressional Budget Office based on Surface Transportation Board, *Rail Rates Continue Multi-Year Decline* (December 2000), p. 22.

effects of the laws is beyond the scope of this paper, but the descriptions provided below offer an indication of their scope and coverage.

Interstate Commerce Act. The Interstate Commerce Act and its amendments governed most business practices of the railroad industry for more than a century. Before building a rail line, starting or abandoning service, or merging or acquiring control of another company, a railroad had to obtain permission from the Interstate Commerce Commission. Moreover, the commission had (and used) the authority to suspend proposed rates before they became effective. The result was that the railroad industry could not respond quickly to changing economic conditions. As railroads lost business to the trucking industry and as regional traffic patterns changed, the railroads were left with considerable excess capacity. Only after the Staggers Rail Act of 1980 eased rules on abandonment were railroads able to shed large pieces of costly infrastructure—and that process of adjustment has taken many years.

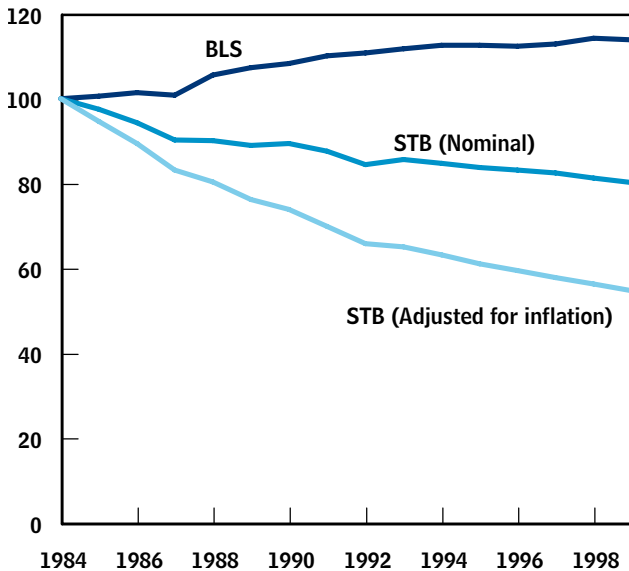
Although the trucking industry also came under the jurisdiction of the Interstate Commerce Commission in 1935, regulation did not have the same detrimental effects on that industry as it had on the railroad industry. Regulation was probably a net benefit to the trucking industry because it protected existing firms from competition.

Examples of regulatory restrictions on railroads' ability to operate in as businesslike a manner as possible include the following:

- Before passage of the Staggers Act in 1980, there was ambiguity about the legality of contracts between railroads and shippers. That ambiguity made railroads reluctant to enter into long-term contracts that could have reduced risk and encouraged investment where future demand was ensured, thereby benefiting both railroads and shippers.

Figure 14.
Comparison of BLS and STB Rail Price Indexes, 1984 to 1999

(Index, 1984=100)



Source: Congressional Budget Office based on Surface Transportation Board, *Rail Rates Continue Multi-Year Decline* (December 2000), p. 22, and Bureau of Labor Statistics' producer price index.

Note: The BLS index is the Bureau of Labor Statistics' producer price index for line-haul railroads (including passenger service); the STB indexes are the Surface Transportation Board's nominal rail rate index and the rail rate index adjusted for inflation using the gross domestic product deflator.

- Before passage of the ICC Termination Act of 1995, railroads were generally prohibited from owning trucking companies or water carriers (or vice versa), except in special circumstances.⁸³ That essentially prevented railroads from being able to market themselves as one-stop-shopping transportation companies that could deliver shipments from origin to destination by whatever mode they deemed most economical.⁸⁴
- The “commodities clause,” in effect from 1906 (with the enactment of the Hepburn Act) to 1995 (with the ICC Termination Act of 1995), prohibited railroads from hauling commodities they owned or produced. Although it was intended to prevent discrimination, it also precluded mergers that might have yielded greater efficiency.

The Railway Labor Act. Enacted in 1926, the Railway Labor Act (RLA) was based on the premise that the railroad industry was so important to the nation's economy that work stoppages would be quite disruptive.⁸⁵ It sets forth an explicit set of procedures that must be followed before railroad workers can go on strike. Rail labor contracts do not expire; instead, the railroads and unions agree to dates when contracts may be opened to new bargaining. Even so, labor stoppages can occur, although they are mitigated by the ability of the National Mediation Board to delay a strike for 30 days through mediation and to notify the President, who can appoint an emergency board and further delay a strike for an additional 90 days. The RLA permits secondary picketing—that is, picketing of companies that are not party to the dispute—which is illegal everywhere else (except in the airline industry, whose labor relations have been covered under the RLA since 1936). As a result, local disputes can have nationwide effects. The RLA predates other federal labor laws, such as the 1935 National Labor Relations Act.

The Federal Employers' Liability Act. Enacted in 1908, at a time when railroads dominated the economic landscape and railroad work was considered particularly hazardous, the Federal Employers' Liability Act (FELA) governs compensation for injuries suffered on the job in the railroad industry (including Amtrak and commuter railroads as well as freight railroads).⁸⁶ In most other industries, workers are covered by state workers' compensation systems, although federal employees are covered under the

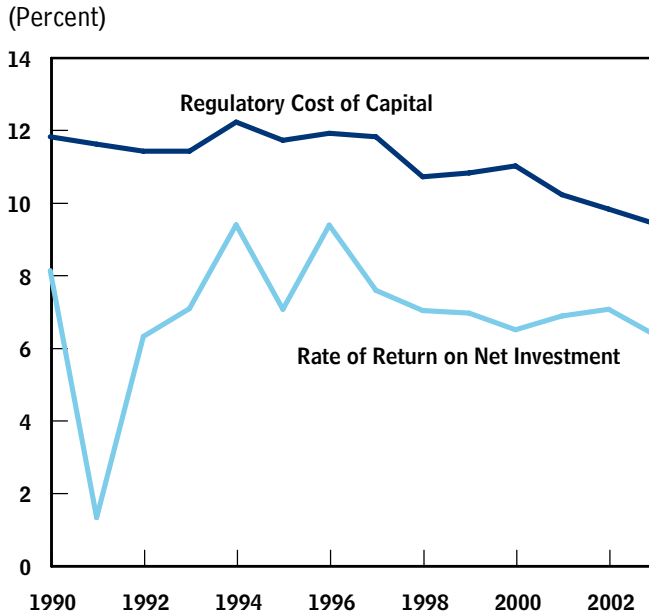
83. The ICC Termination Act (ICCTA) is P.L. 104-88, 109 Stat. 803 (1995). Pursuant to the provisions of former 49 U.S.C. 11344(c), which were repealed in the ICCTA, until 1982 the ICC typically authorized railroads to acquire motor carriers only if their operations were auxiliary to the railroad's business. The ICC made exceptions under the “special circumstances” rule, but only if it found that the transaction would not restrain competition and that it would be in the public interest. The ICC generally found that the special-circumstances test was not met unless the to-be-acquired motor carrier served routes not regularly served by other motor carriers. See *American Trucking Ass'n v. ICC*, 722 F.2d 1243, 1246-1247 (5th Cir. 1984). The provisions of former 49 U.S.C. 11321 precluded railroads from owning water carriers that could compete with them, unless the ICC found that the water carrier could be operated in the public interest without diminishing competition. That provision was also repealed in the ICCTA.

84. D. Philip Locklin, *Economics of Transportation*, Seventh Edition (Homewood, Ill.: Richard D. Irwin, Inc., 1972), pp. 862-867.

85. The RLA is codified as amended at 45 U.S.C. 151-163.

86. FELA is codified as amended at 45 U.S.C. 51-60.

Figure 15.
Cost of Capital and Return on Investment, 1990 to 2003



Source: Congressional Budget Office based on Association of American Railroads, *Railroad Facts, 2004 Edition*, pp. 18–19.

Federal Employees' Compensation Act, and certain maritime industry workers are covered under the Longshore and Harbor Workers' Compensation Act.⁸⁷ Although FELA has been amended several times, it remains essentially the same as when it was enacted.

FELA takes liability into account, in contrast to most other workers' compensation, which is no-fault. It employs the concept of comparative negligence, so that even if a worker was partially responsible for an injury, he or she can claim compensation for the portion of negligence attributed to the railroad. Under FELA, a worker can be compensated for lost earnings; under the other laws, replacement of earnings is limited.

The railroad industry believes that moving from FELA to the states' workers' compensation systems could benefit the industry substantially.

87. Joe Richardson, *The Federal Employers' Liability Act (FELA): Background and Controversy*, CRS Report for Congress 96-189 EPW (Congressional Research Service, updated January 2, 1997).

GAO has found that FELA may be more costly than standard workers' compensation, depending largely on the relative number of workers who were permanently disabled by on-the-job injuries.⁸⁸ If fewer than two-thirds of the workers who were eligible for workers' compensation were permanently disabled, no-fault workers' compensation would probably be less costly; if more than two-thirds were permanently disabled, FELA would be less costly. That results in part because the amount of FELA awards does not necessarily reflect the degree of disability, whereas under workers' compensation, a worker who is able to return to work no longer receives workers' compensation.

The Railroad Retirement Act. The Railroad Retirement Act, passed in 1934—a year before the Social Security Act—established the Railroad Retirement System, which has features similar to Social Security but includes only railroad workers in the system.⁸⁹ The narrow base makes the railroads and their workers highly dependent on each other's fortunes. As the number of railroad workers has dropped over many years, the problem of a decreasing number of workers paying into a system to support a large number of retirees has been even more pronounced than that for Social Security.

Railroad Unemployment Insurance System. The Railroad Unemployment Insurance System was established in 1938.⁹⁰ It was created to address problems that unemployed railroad workers faced in obtaining benefits from state unemployment insurance programs because their work took them across state lines, thus making it unclear which jurisdiction was responsible for paying benefits. The railroad system is funded entirely by taxes imposed on the railroads; it is administered by the Railroad Retirement Board. The unemployment insurance account has authority to borrow from the railroad retirement account if needed to pay benefits.

Labor Protection for Railroad Employees. The Interstate Commerce Act provides mandatory labor protection for

88. General Accounting Office, *Federal Employers' Liability Act: Issues Associated With Changing How Railroad Work-Related Injuries Are Compensated*, GAO/RCED-96-199 (August 1996).

89. The original legislation was held to be unconstitutional. The Railroad Retirement Act of 1935 is codified (as amended and revised) at 45 U.S.C. 231-231v.

90. Railroad Unemployment Insurance Act of 1938, codified as amended at 45 U.S.C. 351-369.

railroad employees affected by certain STB-approved transactions. For example, employees receive up to six years of wage protection, as well as moving and retraining allowances, following certain types of mergers and abandonments.⁹¹

Railroad Bankruptcy Laws. Bankruptcy law treats railroads somewhat differently from most other businesses.⁹² The existence of railroad-specific provisions most likely would have very little effect on investors' current willingness to invest in the Class I freight railroads because those railroads do not appear to be in danger of going bankrupt. Still, the laws constrain railroads' options relative to those of their competitors and other industries.

In general, bankruptcy law is intended to provide as much repayment as possible to creditors while recognizing that the debtor cannot repay the full amount owed. Liquidating the assets of the debtor is one option. The other is to find a way to reorganize so as to preserve as much value as possible of the debtor's business so that creditors will have more assets to share. Railroad bankruptcy law makes liquidation a measure of last resort, allowing it only if a reorganization plan has not been approved within five years of the bankruptcy filing.⁹³ That restriction is in keeping with the tradition of providing for the public interest in railroad-specific legislation. Railroad bankruptcy law requires that the bankruptcy court and trustee consider the public interest in preserving the debtor's rail service—in addition to the interests of creditors—when they make decisions regarding the debtor's reorganization.⁹⁴ According to one railroad historian, "Railroad bankruptcy law was written to favor reorganization over creditors' rights, on the assumption the railroad was a public utility on which the public depended."⁹⁵

91. More precisely, such labor protection applies to railroad abandonments other than entire system abandonments, mergers involving a large railroad and more than one medium-sized railroad, a line acquisition by a large railroad, and certain acquisitions by medium-sized or small railroads in which large or medium-sized railroads are involved.

92. Chapter 11, Subchapter IV, of the Bankruptcy Code, 11 U.S.C. 1161-1174, deals with railroad bankruptcy.

93. Robin Jeweler, *Railroad Reorganization under the U.S. Bankruptcy Code: Implications of a Filing by Amtrak*, CRS Report for Congress RL31550 (Congressional Research Service, August 26, 2002), p. 4, citing 11 U.S.C. 1174.

94. 11 U.S.C. 1165.

If a railroad bankruptcy were to occur, perhaps the most costly potential constraint would be in connection with labor provisions. A bankruptcy court would not be allowed to modify any collective bargaining agreements governing wages or working conditions except as provided by the Railway Labor Act.⁹⁶ If a debtor railroad is merged into another railroad, the pay and benefits of the employees of the debtor railroad must be protected.⁹⁷

Amtrak-Related Requirements. The freight railroads are required by law to allow Amtrak to use their tracks with priority treatment at favorable rates.⁹⁸ Amtrak is required to pay only its marginal cost, but that has been interpreted as excluding the cost of delaying freight trains. When freight railroads had excess capacity, Amtrak imposed little in the way of congestion costs. Now, however, those costs may be substantial—to both Amtrak and the freight railroads—on certain routes at peak times.⁹⁹ For example, competing demands of Amtrak and surging intermodal traffic on Union Pacific's line between Los Angeles and El Paso have led to delays in both freight and passenger service.

Policy Options

The railroad industry appears to be adding to capacity in anticipation of long-term increases in demand for freight transportation. If experts conclude that the railroads are not investing as much or as rapidly as necessary to meet future demands, however, then policymakers might want to find ways of addressing some of the factors that were identified in the previous section as possible impediments to investment.

Policies Related to Ownership of Infrastructure

Railroads own and operate their infrastructure—a fact that affects them adversely when compared with their primary competitors, the trucking and water carrier industries. Because those industries do not bear the full cost of

95. Richard Saunders Jr., *Main Lines: Rebirth of the North American Railroads, 1970-2002* (DeKalb, Ill.: Northern Illinois University Press, 2003), p. 154.

96. 11 U.S.C. 1167.

97. 11 U.S.C. 1172(c)(1).

98. 49 U.S.C. 24308.

99. See Joseph Vranich, *End of the Line: The Failure of Amtrak Reform and the Future of America's Passenger Trains* (Washington, D.C.: The AEI Press, 2004), p. 61.

their use of highways and waterways, they enjoy a competitive advantage over the railroads. That imbalance can be addressed through policies that cause trucks and barge operators to cover their costs of using publicly provided infrastructure or through financial assistance to the railroad industry. The first type of policy is generally considered more likely to result in improved economic efficiency because it directly addresses the underlying causes of the disparity.

Impose Charges on Trucks and Barges to Cover Their Cost of Using Infrastructure. Changing the structure of user taxes and fees so that trucks and barge operators pay the costs associated with their use of highways and waterways would lead to a more efficient allocation of transportation resources, both within and across modes.¹⁰⁰ When users of infrastructure (or any service) are not charged the cost of providing it, the result can be economic inefficiency—in this case, greater spending on highways and waterways than would be justified on economic grounds. Addressing the inefficiency might entail imposing charges based on trucks' weights and the distance they are driven, with escalating rates as weight increased.¹⁰¹ The Transportation Research Board's special report on freight transportation recommends that approach, advising that the structure of highway user taxes (which are primarily fuel taxes) be reformed "so that they more closely relate to costs each highway user imposes."¹⁰²

Provide Federal Financial Assistance. Another way of addressing the underpayment of infrastructure costs by railroads' competitors is to provide financial assistance to the railroads. Such assistance could be given directly to railroad companies or to sponsors of rail projects (such as state or local governments or public/private partnerships). Providing federal aid for a rail investment might be economically justified if the net social benefits were large but the net private benefits to railroads were insufficient to induce them to make such an investment. The calculation of a benefit-cost ratio can be difficult and subject to distortion, however, if the full costs of other

modes—not just the amounts paid in taxes—are not included.

Railroads are currently eligible for federal loans and loan guarantees under the Railroad Rehabilitation and Improvement Financing (RRIF) program. Until now, few railroads have sought financing under the program because some of the conditions were considered onerous. Recently passed legislation removes some of those obstacles and expands funding authorization for the program tenfold, providing for up to \$35 billion in loans and loan guarantees to be outstanding at any given time.¹⁰³

Some railroad projects may have benefits to the public that are large in comparison to the prospective private benefits to railroads. In those cases, if the railroads cannot capture the public benefits, they may decide not to undertake the projects because they weigh their costs against only their private benefits. If public benefits were included in the calculation, and if public plus private benefits exceeded the costs, then it might be appropriate for governments to provide financial assistance for the projects. A rationale for governmental (though not necessarily federal) assistance for such a project is the existence of external benefits or costs, such as congestion or air pollution, that the project could address.¹⁰⁴

In the past, the federal government has provided assistance for specific projects, such as the Alameda Corridor in southern California. That project was aimed at alleviating congestion caused by railroads and truckers serving the ports of Los Angeles and Long Beach. The federal government guaranteed a loan of \$400 million, which has been repaid, for the \$2.4 billion project. Another large intermodal project that is under way is the Chicago Region Environmental and Transportation Efficiency Project (CREATE), a \$1.5 billion effort to eliminate rail bottlenecks and to reduce truck traffic that carries freight

100. See Congressional Budget Office, *Paying for Highways, Airways, and Waterways: How Can Users Be Charged?* (May 1992).

101. Damage to highway pavement is an exponentially increasing function of vehicles' weight per axle.

102. Transportation Research Board, *Freight Capacity for the 21st Century*, p. 8.

103. As originally authorized in section 7203 of the Transportation Equity Act of the 21st Century, 45 U.S.C. 822(d), the RRIF program provided for obligations up to \$3.5 billion, with up to \$1 billion set aside for short-line railroads. In August 2005, the amounts were expanded tenfold in section 9003(d) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), P.L. 109-59, 119 Stat. 1144, 1922 (2005).

104. A more direct approach, however, would be to reflect the costs of congestion and pollution in charges imposed on vehicles of all modes.

between rail lines. That project had not received federal funding prior to passage of highway and transit reauthorization legislation in August 2005, when it was given \$100 million over five years.¹⁰⁵

The TRB special report on freight capacity urged caution about providing government assistance. It encouraged careful benefit-cost analysis of alternative ways of transporting freight and alternative financing arrangements, as well as a demonstration “that public benefits exist that raise the public rate of return above the private rate.”¹⁰⁶ It also noted that “An alternative policy to rail grants would be to adjust truck taxes to ensure that trucks covered their costs. Shippers would then select the best transportation options on the basis of true costs.”¹⁰⁷

105. Section 1301(m) of SAFETEA-LU, P.L. 109-59, 119 Stat. 1144, 1198 (2005).

106. Transportation Research Board, *Freight Capacity for the 21st Century*, pp. 11 and 135.

107. *Ibid.*, pp. 43-44.

Policies Related to Railroad-Specific Laws

The panoply of railroad-specific laws that were summarized in the previous section imposes requirements that affect the railroad industry differently from its competitors and other industries in the United States. Examining the laws’ effects—in particular, whether they impose greater costs on the railroad industry—could suggest whether revising them could lead to greater productivity for railroads and a more efficient allocation of resources for the nation’s economy. (Such an examination is beyond the scope of this paper.)

The railroad-specific laws may have had greater justification when that industry dominated the economy. As the industry has fallen from a central role, however, those industry-specific policies may no longer serve their intended purposes and may cause transportation resources to be allocated inefficiently, to the detriment of the U.S. economy.