Policy Analysis

Cato Institute Policy Analysis No. 33: Efficiency and Adjustment: The Impact of Railroad Deregulation

January 31, 1984

Michael W. Babcock

Michael W. Babcock is an associate professor of economics at Kansas State University in Manhattan, Kansas.

Executive Summary

The Staggers Rail Act of 1980 marked the most significant change in rail policy since the Interstate Commerce Act of 1887. It eliminated most common-carrier obligations, granted railroads greatly increased commercial freedom, and generally reversed previous policy. What caused this dramatic reversal? What changes in the transportation markets contributed to this regulatory reform of the railroads? Some perspective on these questions can be gained from table 1. It compares the performance of the transportation sector to that of the economy as a whole. Changes in the demand for transportation closely parallel changes in the demand for production, because of the derived nature of transport demand. Thus, between 1950 and 1982, ton-miles of intercity freight and the gross national product increased by similar magnitudes. However, the growth in the demand for transportation was less than the growth of GNP and industrial production. This difference is partly due to technical improvements in manufacturing that require less raw-material input per unit of output. Changes in the composition of GNP have also affected relative growth. As proportionately more resources are devoted to service production, inevitably the demand for goods transportation will grow less rapidly than the general economy.

The Decline of Rail Transportation

During the 32 years ending in 1982, the increase of 112 percent in intercity freight ton-miles was not evenly distributed among modes. Rail ton-miles only increased 36 percent during the period, as we see in table 2, while the principal competitors of railroads experienced much larger increases. For example, motor-carrier ton-miles increased 190 percent and inland water-carrier demand increased 452 percent. Airlines, although they achieved a very large percentage increment, remain a small part of the inter-city freight market.

Changes in intercity freight market shares between 1950 and 1982 are shown in table 3. The decline in rail market share is striking. In 1950, railroads accounted for 56 percent of the domestic intercity ton-miles. By 1982 the rail share had declined to 36 percent, a decrease of 35.7 percent. In contrast, the motorcarrier share increased from 16 percent to 22 percent, an

Table 1
The Performance of the Transportation Sector in Relation to Economic Growth, 1950-82

Year	GNP	Total	Services	Services as Percent of Total	Industrial(b) Production	Intercity Freight: Ton-Miles(in billions)

1950	$535	$338	$133	39.3	45	1,063
1955	658	395	158	40.0	59	1,274
1960	737	453	192	42.4	66	1,314
1965	929	558	241	43.2	89	1,638
1970	1,086	669	297	44.4	108	1,936
1975	1,232	775	355	45.8	118	2,066
1980	1,474	935	441	47.2	147	2,487
1982	1,477	948	445	46.9	139	2,252
Percentage change, 1950-82	176.0	180.4	234.6	19.3	208.9	111.9

Sources: Transportation Policy Associates, Transportation in America (1983); U.S. Department of Commerce, Survey of Current Business. (a)Amounts given are in billions of 1972 dollars. (b)Index 1967 = 100.

Table 2
Intercity Freight Ton-Miles by Mode of Transport, 1950-82 (Billions of Ton-Miles)

Year	Railroads	Trucks	Oil Pipelines	Great Lakes	Rivers and Canals	Airlines	Total
1950	597	173	129	112	52	0.30	1,063
1955	631	223	203	119	98	0.49	1,274
1960	579	285	229	99	121	0.89	1,314
1965	709	359	306	110	152	1.91	1,638
1970	771	412	431	114	205	3.30	1,936
1975	759	454	507	99	243	3.73	2,066
1980	932	555	588	96	311	4.84	2,487
1982	812	502	558	88	287	4.90	2,252
Percentage change 1950-82	36.0	190.2	332.6	-21.4	451.9	1533.3	111.9

Source: Transportation Policy Associates, Transportation in America (1983).

Table 3
Domestic Intercity Ton-Miles by Mode of Transport, 1950-82 (Percent of Market)

Year	Railroads	Trucks	Oil Pipelines	Great Lakes	Rivers and Canals	Airlines
1950	56.2%	16.3%	12.1%	10.5%	4.9%	--
1955	49.5	17.5	15.9	9.3	7.7	--
1960	44.1	21.8	17.4	7.5	9.2	--
1965	43.3	21.9	18.7	6.7	9.3	.1%
1970	39.7	21.3	22.3	5.9	10.6	.2
1975	36.7	22.0	24.5	4.8	11.8	.2

1980	37.5	22.3	23.7	3.9	12.5	.2
1982	36.1	22.3	24.8	3.9	12.7	.2

Source: Transportation Policy Associates, Transportation in America (1983).

Table 3
Domestic Intercity Ton-Miles by Mode of Transport, 1950-82
(Percent of Market)

	Private Carrier		Public Carrier		
Year	Car	Air	Air	Bus	Rail
1950	87.0%	.2%	1.8%	4.5%	6.5%
1955	89.7	.2	3.0	3.1	4.0
1960	90.4	.3	4.1	2.5	2.8
1965	89.2	.5	5.9	2.6	1.9
1970	86.9	.8	9.3	2.1	.9
1975	86.5	.8	10.1	1.9	.7
1980	83.5	.9	13.1	1.8	.7
1982	83.5	.9	13.2	1.7	.7

Source: Transportation Policy Associates, Transportation in America (1983).

increment of 37.5 percent. Inland water carriers increased their share from about 5 percent in 1950 to nearly 13 percent in 1982, a 159 percent increase in market share.

The decline in rail passenger demand from 1950 to 1982 has also been significant. Market shares of intercity passenger travel are shown in table 4. In 1950, railroads accounted for 6.5 percent of the intercity passenger miles. By 1982 the rail share had decreased to less than 1 percent. Surprisingly, the automobile share of the market actually declined from 87 percent in 1950 to 83.5 percent in 1982. The most dramatic change in the passenger market, of course, has been the explosive growth of air travel. In 1950, all air carriers, public and private, accounted for only 2 percent of the market. However, by 1982 their combined share had increased to 14 percent, a sevenfold increase.

The decline in rail revenue (compared to other modes) parallels the relative declines in freight and passenger demand. The percentage distribution from 1950 to 1981 of total transport revenue is shown in table 5. In 1950 railroads captured 64.3 percent of the total revenue. But by 1981, the rail share was only 26.5 percent -- a 58.8 percent slide. In contrast, motor carriers, airlines, and pipelines achieved increases in their share of transport revenue. The motor-carrier share increased by 56 percent, while the market share for airlines and pipelines rose 527 percent and 103 percent, respectively.

The decline in the fortunes of rail has not been limited to a few markets. In table 6, the growth in rail tonnage of various commodities is compared to the corresponding growth in production. Between 1964 and 1980, railroads showed significant tonnage increases in coal, paper products, chemicals, petroleum and coal products, and transportation equipment. In each case, however, the tonnage increases have lagged behind the changes in industrial production. In other markets, railroads experienced substantial absolute tonnage decreases. These markets include nonmetallic ores (-31.8 percent); stone, clay, and glass products (-24.3 percent); and primary metal products (-36.6 percent).

What accounts for the pervasive decline of railroads? One of the important factors has been the government's vigorous promotion of competing modes. The airways system, for example, received federal funds amounting to $20 billion from 1925 to 1976.[1] Federal aid to airports during the 1970s came to approximately $5 billion. Aid to airports from state and local governments had accumulated to nearly $17 billion by 1976.[2] These expenditures, along with federal

money for the interstate highway system, have contributed to the decline of rail passenger demand.

Distribution of Total Revenues by Mode of Transport, 1950-81 (Percent of Market)					
Year	Rail	Highway	Air	Pipeline	Water
1950	64.3%	26.8%	4.0%	2.8%	2.1%
1955	56.4	31.2	6.6	3.5	2.3
1960	47.8	36.1	10.5	3.6	2.0
1965	41.5	39.8	13.8	3.3	1.6
1970	34.34	41.5	19.6	3.2	1.3
1975	31.3	41.6	22.0	3.8	1.2
1981	26.5	41.8	25.1	5.7	.9

Source: Transportation Policy Associates, Transportation in America (1983).

Table 6 Change in Tonnage of Selected Products Originated by Rail in Relation to Change in Industrial Production between 1964 and 1980		
	Percent of Change	
Commodity	Rail Tonnage	Industrial Production
Metallic ores	-9.3%	11.9%
Coal	46.0	64.8
Nonmetallic ores	-31.8	51.4
Food products	-3.3	63.8
Lumber and wood product	.1	23.9
Pulp and paper products	27.8	74.1
Chemicals	64.5	164.5
Petroleum and coal products	27.0	46.5
Stone, clay, and glass products	-24.3	62.4
Primary metal products	-36.6	5.0
Transportation equipment	17.7	48.3

Source: Data on rail tonnage from ICC, Freight Commodity Statistics -- Class 1 Railroads. Data on industrial production obtained from Federal Reserve Bulletin (Board of Governors, Federal Reserve System).

The total cost of constructing the interstate highway system alone may well reach $100 billion, with the federal government bearing 90 percent of the cost. The interstate system had the effect of increasing all aspects of motor-carrier service, and hence contributed to the decline in rail manufactures traffic.

As of 1976, the federal government had spent $12 billion on domestic waterways and ports.[3] These outlays increased 250 percent during the 1960-80 interval. Promotion of waterways, by strengthening the competitiveness of water carriers, has reduced rail traffic in bulk commodities.

However, the most significant factor in the financial decline of the railroad is economic regulation. Rate regulation prevented the managers of railroads from responding to changing conditions in the transportation market. It also

imposed costs on railroads by preventing timely abandonment of uneconomical branch lines. Although the ICC has permitted railroads to reduce excess capacity, the bureaucratic nature of the decision making has caused needless expense to the railroads. One study concluded that elimination of only the most uneconomical branch lines would have resulted in a one-time saving of about $3 billion in 1977.[4]

Regulation of per diem rates, demurrage charges, and rate divisions led to other excessive costs. One study estimated that these costs were between $1.5 billion and $1.7 billion.[5] Regulation also prevented railroads from eliminating costly distortions in the rate structure designed to protect small shippers, certain ports, and producing areas.[6] Any change proposed resulted in numerous protests from the affected carriers, shippers, and regional interests. The resulting slow, cumbersome ratereview process severely diminished rail profitability.

Economic Criteria for Rail Regulation

Regulation can be rationalized if it improves resource productivity enough to more than offset the losses that railroads must absorb. One of the criteria for economic regulation is the case of natural monopoly. In relation to competitive markets, monopoly leads to higher prices, lower output, and an under-allocation of resources to the product produced by the monopoly. Thus regulation is needed to keep prices high enough to attract capital but not high enough to yield monopoly profits.

A natural rail monopoly is hypothesized in the figure on the following page. The minimum point on the hypothetical railroad's long-run average cost curve (LRAC) occurs at a traffic level substantially higher than the demand for service. Thus the market only has room for one economically efficient (minimum-cost) firm. [Graph Omitted]

A natural rail monopoly. D=demand; LRMC=long-run marginal cost; LRAC=long-run average cost.

The following scenario will show the possible outcome of competition in a natural-monopoly market. Suppose several firms enter such a market and begin to compete. This process may be initiated by one of the firms, in an attempt to increase market share, reducing price below that of the competing firms. As long as the reduced price remains higher than marginal cost, this will be a profitable move. However, rival firms are likely to match the initial price cuts, and a rate war may ensue, forcing price down to marginal cost. All firms will then be incurring losses, because marginal cost and price would be less than average cost. The potential outcomes are (1) collusion to stabilize the market, or (2) eventual bankruptcy for all but one of the firms. In either case, monopoly power and pricing is the result.

Is the railroad industry a natural monopoly? The empirical evidence overwhelmingly suggests that it is not. One key question is whether the minimum efficient traffic level exceeds the demand for rail service. On this point the empirical evidence is not conclusive. However, most recent studies suggest that conditions of natural monopoly are not present at existing main-line traffic densities.[7]

The most persuasive evidence of a lack of market power in the rail industry is the relative declines in ton-miles, passenger miles, and revenue mentioned previously. In today's

highly competitive transport markets, railroads have no significant market power. Modal market shares for 1977 by major commodity group are given in table 7. Railroads do have significant market shares in such bulk commodity markets as farm products, coal, and ores. However, in these markets railroads are subject to strong competition from water carriers. Railroads also have substantial shares of certain manufactures markets. These include: food products (45.2 percent); tobacco products (52.5 percent); lumber and wood products (53.5 percent); pulp and paper products (68.2 percent); chemicals (53.5 percent); primary metals (46.9 percent); and motor vehicles (72.1 percent). However, in many of the manufactures markets, railroads have less than a one-third share. Thus in nearly all of those markets, railroads face vigorous competition, primarily from motor carriers.

Other than the case of natural monopoly, economic criteria for regulation include zero marginal cost of production (the case of a pure public good) or significant external costs (such as pollution or congestion). Neither of these criteria is relevant to the railroad industry.

Regulatory Reform of the Railroads

As the financial condition of railroads declined, it was clear that regulation was not working. It had not led to a viable privately owned rail system that provided good service to the public. The Penn Central railroad went bankrupt in 1970 and became part of Conrail in 1976. Several other northeastern railroads went bankrupt during the early 1970s, including the Erie Lackawanna, the Lehigh Valley, the Reading, and Central of New Jersey. By 1976 the Rock Island and the Milwaukee were also approaching bankruptcy.

Public sentiment favorable to railroads was also influenced by the oil embargo of 1973-74. The expectation of increasing energy prices, coupled with the relative energy efficiency of rail transport, created an environment conducive to a change in policy.

These events contributed to the passage of the Railroad Revitalization and Regulatory Reform (4R) Act of 1976. It contained the following rate-regulation provisions:

1. The variable cost of rail transport was recognized as the minimum rate. Rates equal to or greater than variable cost could not be declared unreasonable unless so proven.

2. The Interstate Commerce Commission could eliminate regulation in markets where railroads have no market power.

Table 7
Market Shares Held by Modes of Transport, 1977

Industry	Rail	Motor Carrier	Private Truck	Air	Water	Pipeline	Other
Farm products (01)	65.1	8.5	--	--	26.4	--	--
Metallic ores (10)	61.0	.5	--	--	38.4	--	--
Coal (11)	72.6	--	--	--	27.4	--	--
Crude oil (13)	.2	.5	--	--	16.1	83.2	--
Nonmetallic ores (14)	53.6	2.3	--	--	44.1	--	--
Food and kindred products (20)	45.2	33.5	15.5	--	5.6	--	--
Tobacco products (21)	52.5	45.7	1.4	--	--	--	.2
Textile mill products (22)	10.8	60.6	26.1	.5	.3	--	1.7
Apparel products (23)	7.5	58.0	17.5	3.3	--	--	13.6
Lumber and wood products (24)	53.5	14.0	29.4	--	2.9	--	.2
Furniture products (25)	21.6	54.3	21.7	.2	.8	--	1.4
Pulp and paper products (26)	68.2	21.6	8.9	--	.9	--	.3
Printed matter (27)	14.2	59.7	10.9	1.8	.3	--	13.2
Chemical products (28)	53.3	24.1	9.3	--	11.7	1.3	.2
Petroleum and coal products (29)	2.6	5.2	--	--	50.9	41.3	--
Rubber products (30)	23.6	60.6	14.1	.4	.2	--	1.0
Leather products (31)	2.3	63.8	24.9	1.4	.7	--	6.8
Stone, clay, and glass products(32)	31.9	32.5	32.3	--	3.2	--	--
Primary metal products							

(33)	46.9	42.3	7.7	.1	2.7	--	.2
Fabricated metal products (34)	26.7	54.0	17.4	.4	.7	--	.7
Machinery, except electrical (35)	22.4	62.1	11.0	1.9	.3	--	2.2
Electrical machinery (36)	26.2	53.2	13.9	2.2	2.3	--	2.3
Transportation equipment (37)	67.4	20.9	7.2	1.2	.3	--	3.0
Motor vehicles (371)	72.1	19.0	5.7	.9	.3	--	1.9
Instruments (38)	17.0	65.7	8.8	2.6	.2	--	5.8
Miscellaneous manufactures (39)	11.8	67.5	12.5	1.1	.9	--	6.1

Sources: Data for industries 20 through 39 (except 29) from Census of Transportation 1977. Data to compile market shares for industries 1 through 11 and 14 were obtained from ICC, Freight Commodity Statistics -- Class I Railroads; U.S. Army Corps of Engineers, Waterborne Commerce of the U.S. -- National Summary; and ICC, Freight Commodity Statistics: Motor Carriers of Property. Data for industries 13 and 29 were obtained from Transportation Policy Associates, Transportation in America (1983).

3. It was recognized that rates must be high enough to attract capital.

4. Railroads were to be allowed to raise or lower rates by 7 percent without prior ICC approval when there is no market dominance.

The 4R Act also contained provisions dealing with abandonment of light-density rail lines. Railroads, it stated, cannot be forced to provide money-losing service; it also set a time limit for deciding abandonment cases. Subsidies were provided for branch lines approved for abandonment but designated as essential by state and local governments.

The 4R Act instituted changes in merger policy. The length of merger deliberations was not to exceed two years, and a decision was to be rendered within 180 days after the case was closed. The Secretary of Transportation was directed to participate more actively in rail mergers and to facilitate them as much as possible.

However, deregulation did not really begin until 1979, when President Carter appointed two pro-deregulation economists, Darius Gaskins (chairman) and Marcus Alexis, to the ICC. The ICC granted exemptions from regulation to fresh fruits and vegetables in 1979 and to a wide assortment of unprocessed agricultural products in 1980.[8] It also began granting contract rates (later legalized by the Staggers Act). Two large mergers were approved in 1980 -- the merger of the Burlington Northern with the St. Louis and San Francisco, and of the Chessie System with the Seaboard Coast Line.

Despite deregulation, however, the financial condition of the railroads continued to deteriorate. The Rock Island and Milwaukee railroads went bankrupt, and Conrail incurred large deficits. The 7 percent zone of rate flexibility provided in the 4R Act had proven to be inadequate; railroads desired much more freedom to set rates.[9] Petroleum prices and imports continued to increase, again highlighting the energy efficiency of railroads. The rapid inflation of 1979-80 focused attention on the need for such structural improvements in the economy as increased competition in the transportation sector. It was hoped that the earlier apparent success of airline deregulation could be repeated in the rail industry.[10]

In this environment the Staggers Rail Act was passed and signed by President Carter on 14 October 1980. The most fundamental change in rail policy since the Interstate Commerce Act of 1887, the Staggers Act generally reversed the previous policy of rigid regulation. Several provisions of the act relate to rail rates:

1. The ICC has no jurisdiction over maximum rail rates unless (a) market dominance exists, or (b) the rate is 180

percent or more of variable cost, or both.[11] If the situation fits neither of the above criteria, the rate must be reasonable. After 1984, maximum rates are to be based on the ability of the railroad to earn an adequate return on investment.

2. The ICC has no jurisdiction over minimum rates as long as they at least cover variable cost.

3. Railroads may provide contract rates. (This provision reverses both previous ICC policy and common law.) The right to protest a contract is strictly limited. The contestant must prove that the contract impairs the ability of the railroad to meet its common-carrier obligation to the shipper. Contract rates cannot be opposed by competing carriers.

4. The ICC may exempt railroads from all regulation in markets where they have no market power.

5. General rate increases may be made quarterly to offset the impact of inflation.

Thus the Staggers Act permits a great deal of pricing freedom. Also, to ensure that competitive forces determine rail rates, the Staggers Act severely restricts joint rate-making. No single-line rail rates may be discussed in rate bureaus, and joint rates may be discussed only by "practicably participating" carriers.

The Staggers Act speeds up the decision-making process in cases of abandonment. A final decision, including responses to appeals, must be made within 255 days of the date of application. This is significant because the lengthy decision process often dissuaded railroads from submitting applications unless they had a high probability of being approved. Other provisions of the Staggers Act also facilitate abandonment. For example, because reported rail costs must include the cost of capital, abandonment can more readily be justified. Abandonment is also eased by the federal subsidies that are available to any financially responsible party that is willing to purchase a light-density rail line.[12] The Staggers Act also facilitates rail mergers by requiring that the decision process be completed within 300 days of the date of application.

Since the Staggers Act was passed, ICC policy has been favorable to railroads. The after-tax cost of capital for railroads has been set at realistic levels. This feature of the act is fundamental for determining (1) the revenue adequacy of railroads and (2) maximum permissible rates. The ICC has also granted exemptions from regulation to TOFC (trailer-on-flatcar, or piggyback) traffic and boxcar movement.[13] In July 1981, the ICC made rail rates more flexible by extending the limits of what is permissible in market dominance. Under the new definition, if any one of four forms of competition exists -- intramodal, intermodal, geographic, or product competition -- there is no market dominance. (Product competition means that the shipper or receiver is able to use a substitute for the product covered by the rail rate.) Under the 1980 act, the ICC has been liberal in granting abandonments. In 1979, 653 miles were denied abandonment (15 percent of miles requested). In 1981, only 43 miles were denied (1 percent of miles requested).[14] Another effect of the act has been to allow more mergers. In 1982 the commission approved the merger of the Norfolk and Western with the Southern Railroad. It approved the merging of Union Pacific, Missouri Pacific, and Western Pacific in 1983

Empirical Studies on the Impact of Deregulation

During the debate over the Staggers Rail Act, critics of deregulation argued that railroads still possess substantial monopoly power in many markets. They were apprehensive that deregulation might lead to large increases in rail rates as well as a redistribution of income from shippers to railroads. The latter concern proved baseless, because (as shown above) railroads confront formidable competition from water and motor carriers in nearly all markets. In the matter of rail rates, most empirical studies have concluded that deregulation has not produced large increases. Since the Staggers Act has only been in effect for three years, of course, conclusions regarding its impact on rail rates must be viewed as preliminary. Nevertheless there is an impressive list of empirical studies indicating that strong competition will limit potential increases in rail rates. Grain shippers in the central and northern plains states are often regarded as rail-dependent or "captive" shippers. One might therefore expect deregulation to lead to significant rate increases in this market. However, such is not the case

Several analysts have studied the effects of deregulation on grain markets. Babcock has investigated the impact of deregulation on rail rates in the Kansas wheat market.[15] He compared rail rates before deregulation to competing

truck-barge rates for the principal Kansas wheat movements. In the export market, he found, truck-barge rates to New Orleans would severely limit rail rates to Houston. Much Kansas wheat also moves to flour mills in the eastern United States. Babcock discovered that truck-barge competition would prevent any significant increase in rail rates to eastern destinations. In studying the substantial portion of Kansas wheat that is milled locally and shipped to markets in the eastern United States, he found that truck competition effectively constrains rail rates. After the Staggers Act was passed, however, significant intrarail competition arose in the Kansas export wheat market, with all railroads serving the region instituting competitive multicar rates.

Fuller, Makus, and Taylor investigated the impact of deregulation on rail rates for exported grain.[16] Their conclusions generally conform to those of the Babcock study. In the corn-producing states of Illinois and Iowa, truck-barge competition along the Mississippi, Ohio, and Illinois rivers severely constrains the ability of railroads to raise rates. The estimated price-elasticity of demand (the variability of demand in relation to price) for rail transport in the Corn Belt is -3.75.[17] Any estimate of price elasticity above 1.0 indicates significant intermodal competition. Furthermore, price increases in such markets will result in lower rail revenue. Investigation of the soybean market led to similar conclusions. Truck-barge competition in the vicinity of major rivers results in soybean rail rates close to variable cost. The estimated price-elasticity of demand for rail transport in the soybean market is -3.82. The authors discovered that intermodal competition would restrain rail rate increases in the wheat market as well. The general conclusion of the study is that truck-barge competition will not allow real increases in rail rates for export grain.

Shouse and Johnson have examined the effects of seasonal rail rates in the Oklahoma wheat transport market.[18] They concluded that railroads would not raise their rates during the peak harvest period because of truck-barge competition. A 10 percent increase in rail rates at harvest time produced a 26 percent decline in wheat traffic and a 20 percent decline in revenue. Most of the competition is from motor carriers. However, potential competition from barges using the port of Catoosa on the Arkansas River also inhibits rail rate increases.

Another analysis of the impact of seasonal rail rates on grain traffic was conducted for the state of North Dakota by Wilson, Hvinden, and Cosgriff.[19] They found strong competition between railroads and trucks for the transport of harvest-period grain. A 10 percent increase in rail rates would produce a 13.4 percent increase in motor-carrier traffic. Their principal conclusion is that the flow of grain traffic in North Dakota would not be smoothed by higher seasonal rates because competition from trucks would not allow rail rates to rise enough to encourage additional storage.

The U.S. Department of Agriculture recently released a study of the impact of rail deregulation on agriculture.[20] The study found substantial evidence of innovations in rail rates and service that benefited agriculture, including the small shippers. The study found strong intermodal and intrarail competition in the grain-transport markets. Railroads serving the wheat territory of the upper and central Great Plains and the Pacific Northwest introduced dozens of new unit train rates and made substantial reductions in single-car rates. The study also stated that the economic recession, stable grain exports, and large surpluses of rail cars and barges have contributed to the intense competition and rate reductions.

In sum, significant empirical evidence indicates that deregulation is not likely to lead to substantially increased rail rates in the grain-transport markets. This conclusion is also confirmed by Levin's study of the impact of deregulation on rates and profitability of railroads.[21] Levin concluded that a modest degree of intrarail competition would ensure stable rates for grain transported by rail, while rates for produce would drop 34 percent to 45.4 percent. On the other hand, Levin concluded that deregulation would result in rate increases in the coal and manufactures markets. On the basis of Levin's analysis, it seems that deregulation is likely to lead to a reshuffling of rail rates. Some markets will experience decreases, others will experience increases, but there will not be a generalized increase.

A recent study by Babcock and German lends further credence to this hypothesis.[22] This study examined the competitive relationship between railroads and motor carriers in the intercity manufactures freight markets. One of the principal findings is that the ability of shippers to substitute trucking for rail service varies from market to market. Out of 10 major manufactures markets, the authors found that 5 are rail-price-elastic and 5 inelastic. An elastic demand shows a relatively high degree of substitutability, while an inelastic demand indicates the opposite. To cope with this situation, a railroad may increase revenues by reducing rates in elastic markets and raising them in elastic markets. Thus deregulation should lead to railroads raising rates in some cases but lowering them in others.

The Association of American Railroads has published a study that explores the rail-truck competitive relationship in a wide variety of transport markets.[23] The study focused on competition between railroads and trucks with gross weights of 80,000 to 90,000 pounds. Except in certain commodities, such as coal, chemicals, and petroleum, railroads have only a very small cost advantage in relation to large trucks. In all manufactures markets except chemicals, the cost competitiveness of trucks constrains the ability of railroads to raise rates. The fact that trucks offer generally superior service in aspects such as speed places a further constraint on rail rates. In the manufactures market, rail rates must be less than truck rates to offset the service advantages of trucking.

Comparing rail rates to the Producer Price Index and to motor-carrier rates gives more insight into the impact of deregulation. In the decade before deregulation (1970-80), rail revenue per ton-mile increased 100 percent.[24] During the same interval, the Producer Price Index increased 124 percent and revenue per ton-mile for Class I motor carriers rose by 112 percent. Rail rates, then, increased less than truck rates and prices in general. After rail deregulation, this trend continued. Between 1980 and 1982, rail revenue per ton-mile increased 12.5 percent, while the Producer Price Index increased 13.8 percent and revenue per ton-mile for Class I motor carriers rose by 18.6 percent.

Rail rates for coal have increased faster than rail rates in general. However, since 1971, rates for coal have actually declined 3 percent in real terms, while the price of coal has increased 32 percent.[25]

In March 1979, the ICC exempted rail transportation of fresh fruits and vegetables from all economic regulation. A study by German and Babcock investigated the impact of the exemption on rail tonnage of fresh fruits and vegetables.[26] The authors discovered that all the major western railroads experienced substantial increases in tonnage from the first quarter of 1979 to the second quarter of 1981. Further study by the authors revealed that the four major western railroads (Burlington-Frisco, Union Pacific, Southern Pacific, and Santa Fe) increased their seasonally adjusted average annual tonnage of fresh vegetables by 63.5 percent between 1979 and 1982.[27] The corresponding increase in tonnage for fresh fruits was 45.3 percent. In 1979 the rail share of the transport market in fresh fruits and vegetables was only 11.8 percent. However, by 1981 the rail share had increased to 16.8 percent.[28] Aggressive pricing by railroads accounts for much of the increase in their market share. During the 1979-82 period, revenue per rail-originated ton of fresh fruits declined 18 percent, while that of fresh vegetables declined 16 percent.[29]

A study done by Manalytics Inc. corroborates the findings of German and Babcock.[30] It found that railroads began tailoring price and service to the needs of individual shippers. With a drop in rail rates, the tonnage and the market share of railroads increased.

In March 1981, the ICC granted a regulation exemption to TOFC traffic. Babcock and German recently examined the short-term impact of the exemption.[31] They found that for 1982 the TOFC loadings were 22.4 percent greater as a result of deregulation. Railroads achieved this increase through a number of management initiatives. These include tailoring rates and service to individual shippers, improving equipment utilization, and opening new markets to TOFC service.

Conclusion

The Staggers Rail Act of 1980 greatly increased commercial freedom in the rail industry. However, certain aspects of the law are open to interpretation and will have to be resolved by the ICC. In the areas that are left to its discretion, the ICC should rank high the goal of fostering economic efficiency. One way to do this is to promote competition, including intrarail competition, in the transport markets. This goal has obvious implications for merger policy -- especially parallel mergers (mergers of railroads serving similar markets). In these cases the potential social benefits of reducing redundant capacity ought to be weighed against the potential social costs that attend reduced competition.

Intrarail competition is greatly affected by reciprocal switching agreements. A shipper located on the line of one railroad can gain access to other railroads in the area if the originating railroad is willing to switch cars to other railroads. In contrast, if the railroad is unwilling to switch cars or charges an exorbitant price for the service, the shipper becomes captive to that single railroad. In recent interviews with me, flour-milling executives stated that this has occurred in some cases. The Staggers Act gives the ICC the authority to require reciprocal switching agreements when the railroads are unable to reach agreement by themselves. The ICC should make certain that reciprocal switching charges accurately reflect the cost of the service and do not significantly reduce competition.

The refusal of the railroads to establish joint rates and routes harms intrarail competition, because it precludes shipper access to other regional railroads. The Staggers Act permits joint rate-setting between railroads that make end-to-end connections but not among railroads with parallel routes. However, some railroads compete with other railroads on certain routes and yet connect with them on others. To avoid possibly violating the law, many railroads have refused to establish joint rates. This situation is fraught with disaster for small regional carriers dependent on large interregional firms for connecting traffic. Still, no railroad should be compelled to participate in a joint rate that is not compensatory. In setting policy in this area, the ICC should balance the goal of fostering competition against that of assuring adequate revenue for the railroads.

The Staggers Act allows railroads to enter into contracts with shippers. These contracts benefit railroads by facilitating the planning of equipment and manpower needs and generally reducing uncertainty. Shippers can thereby obtain a stable supply of rail cars at advantageous rates. However, contracts can be used to discriminate. Very little information about contracts is now made public, and under present conditions it is impossible to

determine actual contract rates. The dilemma facing the ICC is how to prevent discrimination while preserving the incentive for railroads and shippers to engage in mutually beneficial contracts. Perhaps the solution to this dilemma is to deregulate freight forwarders, who could obtain contract rates for groups of small shippers.[32]

Overall, deregulation is a significant step toward economic efficiency in the rail industry. Railroads are now able to adjust their rates and service to changing market conditions and are no longer required to provide money-losing service. With a policy based on free-market principles, railroads will continue to play a major role in the U.S. economy.

FOOTNOTES

[1] Association of American Railroads, "Government and Private Expenditures for Highway, Waterway, Railroad, and Air Rights-of-Way," Washington, D.C., September 1977. See table 2.

[2] Ibid., table 3.

[3] Ibid., table 6.

[4] Robert G. Harris, "Economic Analysis of Light Density Rail Lines," Logistics and Transportation Review 16 (January 1980):3-29.

[5] Public Interest Economic Center (Jason Sumner and Allen Ferguson), "Deregulation and Fleet Efficiency," Washington, D.C., July 1980, pp. 64-65.

[6] Kenneth D. Boyer, "Equalizing Discrimination and Cartel Pricing in Transport Rate Regulation," Journal of Political Economy 89 (April 1981): 270-86.

[7] Theodore E. Keeler, "Railroad Costs, Returns to Scale, and Excess Capacity," Review of Economics and Statistics 56 (May 1974):201-8.

[8] Interstate Commerce Commission, Ex Parte No. 346, Sub. 1, Rail General Exemption Authority -- Fresh Fruit and Vegetables, 44 Fed. Reg. 18229 (1979); Interstate Commerce Commission, Ex Parte No. 346, Sub. 2, Rail General Exemption Authority -- Miscellaneous Commodities, 45 Fed. Reg. 20484 (1980). The commodities include peanuts, sweet potatoes, potatoes, bananas, cocoa beans, green coffee, fresh mushrooms, dry beans, dry peas, cowpeas, lentils, lupines, and fresh fish and other marine products.

[9] Before 1979, the ICC nearly always concluded that railroads had market dominance if they could raise or lower rates by 7 percent. Thus the 7 percent zone of flexibility was rendered inoperative by ICC interpretation.

[10] Theodore E. Keeler, "The Revolution in Airline Regulation," in Case Studies in Regulation: Revolution and

Reform, ed. Leonard W. Weiss and Michael W. Klass (New York: Little, Brown and Co., 1981), pp. 69-83.

[11] By October 1984, the maximum permissible ratio will be 180 percent.

[12] Abandonment of light-density rail line was further facilitated by the Northeast Rail Service Act of 1981. This act required abandonment applications of Conrail to be approved by the ICC within 90 days, unless some other party bought the line.

[13] Interstate Commerce Commission, Ex Parte No. 230, Sub. 5, Improvement of TOFC/COFC Regulation, 45 Fed. Reg. 79123 (1980). n April 1983 the movements of boxcars were granted exemption.

[14] Theodore E. Keeler, Railroads, Freight, and Public Policy (Washington, D.C.: Brookings Institution, 1983), p. 107.

[15] Michael W. Babcock, "Potential Impact of Railroad Deregulation in the Kansas Wheat Market," Journal of Economics (Missouri Valley Economics Association) 7 (1981):93-98.

[16] Stephen Fuller, Larry Makus, and Merritt Taylor, "Effect of Railroad Deregulation on Export Grain Rates," North Central Journal of Agricultural Economics 5, no. 1 (January 1983):51-64.

[17] This means that a 1-percent increase in rail rates (competing modal rates constant) will cause a 3.75 percent decrease in rail traffic.

[18] J. C. Shouse and M. A. Johnson, Anticipated Consequences of Seasonal Railroad Rates in the Oklahoma Wheat Transportation Market, Oklahoma State University Agricultural Experiment Station, Research Report P-773, Stillwater, Oklahoma, 1978.

[19] William W. Wilson, Steven C. Hvinden, and John G. Cosgriff, Impacts of Seasonal Rail Rates on Grain Flows and Storage in North Dakota, Upper Great Plains Transportation Institute, North Dakota State University, Report 37. March 1981.

[20] U.S. Department of Agriculture, Office of Transportation, An Assessment of Impacts on Agriculture of the Staggers Rail Act and Motor Carrier Act of 1980 (Washington, D.C.: Government Printing Office, August 1982).

[21] R. C. Levin, "Railroad Rates, Profitability, and Welfare Under Deregulation," Bell Journal of Economics 12 (Spring 1981): 1-26.

[22] Michael W. Babcock and H. Wade German, "1985 Forecast: Rail Share of Intercity Manufactures Freight Markets," Proceedings of the Transportation Research Forum -- 1983, vol. 24, no. 1.

[23] Association of American Railroads, Staff Studies Group, "The Economic Impact of Substituting Truck for Rail Transportation," Washington, D.C., 5 July 1978.

[24] Transportation Policy Associates, Transportation in America (Washington, D.C.: Transportation Policy Associates, March 1983), P. 19.

[25] Association of American Railroads, Rail News Update, 27 July 1983, p. 1.

[26] H. Wade German and Michael W. Babcock, "The Impact of Rail Deregulation on the Movement of Fresh Fruits and Vegetables," The Logistics and Transportation Review 18, no. 4 (December 1982):373-84.

[27] Tonnage obtained from ICC, Freight Commodity Statistics, Class I Railroads (Washington, D.C.: Government Printing Office, various years).

[28] U.S. Department of Agriculture, Fresh Fruit and Vegetable Unloads -- 41 Cities (Washington, D.C.: Government Printing Office, various years).

[29] Revenue-per-ton data obtained from ICC, Freight Commodit Statistics -- Class I Railroads (Washington, D.C.: Government Printing Office, various years).

[30] Manalytics Inc., Exempt Rail Transportation of Fresh Fruits and Vegetables: Initial Impacts, report prepared for the Interstate Commerce Commission, Washington, D.C., March 1980.

[31] Michael W. Babcock and H. Wade German, "Impact of Deregulation on Rail TOFC Carloadings," August 1983, p. 5.

[32] Keeler, Railroads, Freight, and Public Policy, p. 145.