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Twenty-first Annual Meeting

Theme:

“Transportation Challenges in
A Decade of Change”

October 27-28-29, 1980

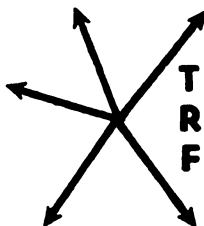
Fairmont Hotel

Philadelphia, Pennsylvania



Volume XXI • Number 1

1980



TRANSPORTATION RESEARCH FORUM

2nd Place Student Paper

Railroad Revenue Adequacy: The Movement of "Captive" Western Coal

by Steven O. Palmer*

INTRODUCTION

FOR YEARS the railroad industry operated under restrictive guidelines established by the Interstate Commerce Commission which often disregarded railroad revenue requirements. This tended to leave rates either too low to cover operating costs with some profit margin, or at the other extreme, so high that they proved to be anticompetitive. This pattern of rate-setting, where little, if any, consideration was given by the Commission (hereinafter also referred to as the ICC) to revenue requirements of the carriers was marked for change in 1976 by Congress with the enactment of the Railroad Revitalization and Regulatory Reform Act (the 4R Act).¹ In this legislation, Congress directed the ICC to determine how much money the railroads had to earn in order to assure adequate levels of operating revenue. Action of this sort had to be taken to improve the carriers' earnings or their investment levels would have been expected to fall far below levels needed to support long-term financial health. Without adequacy of revenue considerations, the resultant shortfall in capital funding would have led to the following:

1. A continuation of fixed plant deteriorations due to inadequate maintenance-of-way budgets and a lack of capital to make major improvements in facilities; this in turn could have led to slower service, a greater number of train derailments, and the possible closing of some lines.
2. A possible weakening of individual capital structures (debt/equity ratios), as additional borrowings would be undertaken on more stringent terms with little, if any, new equity sold.
3. An inability to make those capital improvements necessary to adapt to changing economic patterns, thus limiting the industry's ability to retain its current traffic base or to respond to new areas of economic growth.

4. Decreasing ability to undertake major consolidation and coordination projects aimed at improving densities and reducing costs where such projects require substantial amounts of capital.

The purpose of this paper is twofold.

The first section is structured to examine the ICC's rulemaking procedures for establishing revenue adequacy provisions for the railroads. This will be accomplished primarily through recent Ex Parte hearings. Secondly, an evaluation will be made of the carriers' use of differential pricing to obtain those needed levels of revenue. Of particular importance in this discussion is the role of the captive western coal shipper and the problems differential pricing causes for both the shipper and the carrier.

RAIL CAPITAL REQUIREMENTS

Projections of the railroads' financial future vary depending on the different assumptions used in making them. However, because the financial condition of a railroad is so important to its operations, it is advantageous to have some idea of actual revenue requirements. Table 1 illustrates one such set of figures determined to be necessary for western railroads over the remainder of the century. These levels of revenue need are important, especially when compared to projected revenue levels. It is clear that revenue shortfalls are already substantial, estimated by the Federal Railroad Administration to be upwards of 5 to 7 percent of what is needed.²

Table 2 illustrates the projected investment needs of each of the western railroads directly involved in the movement of coal. These figures show the amount of projected revenue needed for their effective operation as coal carriers. These projections, which are not insignificant, emphasize the need for sound standards to ensure the flow of adequate revenue to the railroads for capital investment.

NEED FOR CONSIDERATION OF REVENUE ADEQUACY STANDARDS

Procedures for developing standards

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for determining adequate revenue levels for carriers, as mandated by the 4R Act, were served by the Commission on February 3, 1978, in Ex Parte No. 338, *Standards and Procedures for the Establishment of Adequate Railroad Revenue Levels*. As proposed, these guidelines focused on three basic considerations: (a) whether there would be a return on net investment equal to the carriers' cost of capital, (b) whether the carriers would have financial ratios indicative of a sound financial condition; and (c) whether the carriers would have a sufficient flow of funds to meet their capital investment requirements.³ This section of this paper examines the Commission's final determinations for using these criteria and other applicable data for establishing revenue adequacy standards.

In establishing the procedural setting for Ex Parte No. 338, the Commission stated the need to make separate annual determinations of revenue adequacy for the entire railroad industry. It was hoped that such action would reduce the dependence on general rate increases as the means for attaining adequate railroad revenue levels and would create a "regular and orderly procedure."⁴ In working to establish these revenue standards, the Commission stated repeatedly that while the provision of adequate revenue was essential in establishing rates for railroads, it was just as important to protect the public from having to provide revenues that exceeded prudent levels. In other words, the ICC considered "revenue adequacy to be taken not only as a goal, but as a limitation."⁵

In these Ex Parte proceedings, the ICC examined the possibilities for in-

cluding adequate revenue considerations in rate determinations on both a nationwide level and for individual carriers, noting drawbacks in both. While recognizing that general rate increases sometimes lead to the end of optimal rate levels for certain services, the ICC concluded that circumstances often do not allow for the inclusion of all factors in individual rate proceedings. For example, in periods of high inflation, prompt across-the-board increases may be necessary to prevent the "dangerous deterioration" of the railroads' financial condition. The Commission then stated that "we cannot afford to ignore opportunities for movement toward the goal of revenue adequacy that may present themselves in general increases. Therefore, revenue adequacy will be taken into account in such proceedings, and will be regarded as an important factor."⁶

In commenting on the ICC proposals for adequacy of revenue determination, several parties addressed the possibilities of utilizing specific service costs in determining the reasonableness of rate cases. In particular, variable cost, which generally serves as the minimum reasonable rate level, was discussed. The Commission, recognizing the complexity of the issues surrounding cost/rate ratios, opted not to undertake serious consideration of cost formulas at that time, concentrating solely on the revenue adequacy standards.

ADEQUATE REVENUE LEVEL DETERMINATION

In the comments received in Ex Parte No. 338 on the initial proposals for establishing the criteria for determining

TABLE 1

RAIL REVENUES NECESSARY TO MAINTAIN MINIMUM NECESSARY NET INCOME ON WESTERN RAILROADS

(Millions of 1971 dollars)

	1985	2000
Operating Costs	\$5,641	\$9,040
Payroll Taxes	688	1,587
State and Local Taxes	179	226
Minimum Necessary Net Income	738	1,039
Revenues	\$7,246	\$11,892

Source: U.S. Congress. Office of Technology Assessment. *A Technology Assessment of: Coal Slurry Pipelines*. Washington, D.C.: Government Printing Office, March 1978.

TABLE 2
PROJECTED RAILROAD INVESTMENTS RELATED TO
WESTERN COAL UNIT TRAIN MOVEMENTS

(Millions of 1978 dollars)

Railroad	Years	Locomotives & Cabooses	Roadway	Total
ATSF	1979-83	\$150.0	120.0	270.0
Union Pacific	1979-83	250.0	50.0	300.0
Southern Pacific	1978	133.2*	96.4*	229.6
Missouri Pacific	1978-83	80.0	17.0	97.0
Burlington Northern	1978-82	341.8	837.0	1,178.8

*Includes funds for hopper cars.

Source: Patrick Haar. "Freight Rates for Western Coal." *Texas Energy Issues*, 1979. Report No. 36. Austin, Texas: LBJ School of Public Affairs, University of Texas at Austin, 1979.

adequate revenue levels, there was little agreement as to which financial indicator was singularly most important. One measurement noted was the rate of return on net investment, which should equal the carriers' cost of capital in revenue adequacy considerations. It was generally agreed that this was an acceptable measure and that it would indicate a rate of return that would be "conducive to the retention and attraction of capital."⁷ However, the ICC noted that because the investment base of the railroads is not, and probably cannot be, stated only in terms of the optimum type and amount of facilities, a full cost of capital return on such a base could not be considered an adequate minimum requirement for revenue determination.

In order to find a more direct means of measuring revenue requirements to supplement the rate of return on railroad capital, the ICC also sought to adopt a funds flow model. While it was recognized that certain problems remain with this type of model* it was felt by the ICC that projections from it would offer a balance against rate of return findings to illustrate the level of composite revenue required for the nation's railroads.

*The basic procedure embodied in a funds flow model of this sort is to project the needed capital outlays and other fund requirements of the railroads, to ascertain the amount of funds available to them and to determine the amount by which the available funds fall short of projected requirements. The dollar amount of this shortfall is then added to the projected revenue level to determine the level of revenue required.

One factor that must be included in any discussion of revenue adequacy criteria is the need for honest, economical and efficient management. Initially, in its determination, the ICC seemed to agree with shippers that such a consideration is an essential means for improving revenue adequacy. The Commission then retreated, qualifying its support, stating that "on the whole, we do not believe that satisfactory means for dealing with the question of efficiency have been presented on the present record."⁸ The Commissioners rationalized their decision not to include efficiency as a criteria for revenue adequacy determinations, stating that "we indicated in our notice of rule-making that efficiency is a matter that may not be susceptible to quantification."⁹ The Commission did say that due to its importance, however, the question of efficient management was not closed and that it would receive the Commission's continued attention.

DETERMINATION OF COST OF CAPITAL

In summarizing Ex Parte No. 338, the ICC decided that in using the overall cost of capital to determine the adequacy of a carrier's revenue, the cost of debt capital would be based in total on embedded interest rates. This was opposed to the use of the current rate of debt or some combination of the two. In addition, it was decided that both the market value method and the comparable earnings method (discussed below) were relevant for the purposes of determining

the cost of equity capital in these proceedings.

The ICC concluded that in a separate proceeding, it would make determinations on each of these factors, after which there would be a final ruling on the overall cost of capital, the basis of future adequacy of revenue hearings. These points were addressed by the Commission in Ex Parte No. 353, *Adequacy of Railroad Revenue*, served on December 5, 1978.

Embedded Cost of Debt

The first point addressed in Ex Parte No. 353 was a determination of the embedded cost of debt. Railroads provided the primary evidence, defining the embedded cost of debt as "the interest and comparable charges an outstanding debt and preferred stock."¹⁰ They argued for a cost figure of 7.0 percent, which was based on historical debt obligations adjusted for higher current debt costs.¹¹ This was accepted by the Commission, with little disagreement from other commenting parties.

Cost of Equity Capital: Market Value Studies

Market value methods for estimating the cost of equity capital rely primarily on stock market data to show the rate of return required to attract stock visitors. A number of market value studies were used by the ICC in its effort to estimate the cost of equity capital for the railroad industry.

Considering the result of those studies

TABLE 3
MARKET VALUE STUDIES

Number	Method Used
11.5%	Equity Risk Premium
12.0	Earnings-Price Ratio
12.5	Earnings-Price Ratio
12.5	Discounted Cash Flow
13.0	Discounted Cash Flow
13.6	Equity Risk Premium
13.1 to 14.1	Equity Risk Premium

Source: Interstate Commerce Commission. Ex Parte No. 353, *Adequacy of Railroad Revenue*. Served on December 7, 1978, Washington, D.C.

taken by the Commission to be of primary importance, namely the discounted cash flow and the equity risk premium estimates, it was decided that a reasonable estimate for the cost of equity capital was in the range of 12.5 to 13.6 percent. By choosing an approximate midpoint of this, the ICC concluded that the cost of equity capital for the railroads stood at 13.0 percent.¹²

Cost of Equity Capital: Comparable Earnings Studies

The second method used to estimate the cost of equity capital was through the examination of the earnings of industries with comparable investment risks. Again, it was the analysis presented by the carriers that the Commission followed. In doing so, they accepted a return on equity capital in firms with similar stock risks of 15.5 percent as "conclusive and justified."¹³ However, it was recognized by the ICC that there were serious objections over the comparability of railroads with any reference group, so long as there were substantial differences in accounting methods.

Overall Cost of Capital

In an effort to simplify these factors to derive an overall cost of capital, the Commission had to make several adjustments in their original determinations of figures. These changes came in the final weighted levels of the cost of debt, the cost of equity and the overall capital structure of the railroad industry, as discussed below.

Cost of Debt. As a practical matter, a determination of the cost of debt capital had already been made in Ex Parte No. 338, where the ICC concluded that such a figure would be based on embedded interest rates. As was stated above, this was adjusted some for current borrowing rates, thus making the final level for the cost of debt capital equal to 7.0 percent.

Cost of Equity Capital. Unlike the decision regarding the final cost of debt level, there was no advance judgement made as to the weight to be given to either the cost of equity capital from market value studies or from comparable earnings studies. In settling this, the ICC went back to its earlier concerns over the value and reliability of the latter, stating:¹⁴

... we are not satisfied that the problems of objectivity and comparability have been resolved, particularly in view of the problems presented by the use of different ac-

counting systems. Finally, we have concluded that even if these problems could be resolved, comparable earnings studies do not provide a true estimate of the cost of capital.

With such reasoning made public, the ICC concluded that it would use a cost of equity capital of 13.0 percent, derived solely by market value studies, establishing the composite cost of capital for purposes of railroad revenue adequacy.¹⁵

Capital Structure. In order to establish an overall figure for the cost of capital, the ICC combined the cost of debt and the cost of equity in the same proportion as found in the capital structure of the railroad industry. After taking comments from both shippers and carriers, it was concluded that a capital structure of 40 percent long term debt and 60 percent equity best represented the actual industry setting and "appear(ed) to be neither imprudent nor excessively conservative."¹⁶

Upon adoption of these criteria for the final determination of the cost of capital in the adequacy of revenue proceedings, it was a simple process to calculate that final figure. In its conclusions in Ex Parte No. 353, the Commission ruled that on a national basis, the figure to be taken for the cost of capital in revenue adequacy proceedings is 10.6 percent.¹⁷ These calculations can easily be illustrated:

$$\begin{array}{rcl} 7.0 \times .40 & = & 2.8 \\ 13.0 \times .60 & = & 7.8 \\ \hline & & 10.6^* \end{array}$$

In Ex Parte No. 338, the ICC had originally stated that separate cost of capital findings should be made for individual carriers as well as for the industry as a whole because of differing embedded debt rates. However, in a later decision, Ex Parte No. 353, *Adequacy of Railroad Revenue*, served March 27, 1979, the ICC reversed itself, stating that revenue adequacy proceedings should "use the same overall cost-of-capital figure for individual carriers as for the national composite."¹⁸

It cannot be expected that the 10.6 rate of return on net investment level will be quickly attained by the nation's carriers. Rather, it is a goal that they must gradually move toward as they reform their systems and achieve greater efficiency. In particular, this will mean

the elimination of excess capacity (via all appropriate forms of restructuring, such as abandonments, mergers, consolidations, liquidations, and joint use of facilities) and through efficient pricing (i.e. separate rates for distinct services, capital incentive rates and contract rates). Regardless of the tactic used, every carrier must strive for the achievement of the 10.6 rate of return equal to the cost of capital in order to attempt to acquire the necessary funds for continued investment. This is not to say that they should rely solely on increased rates for market dominant traffic, as will be discussed below, specifically citing the example of captive western coal movements. Other means must be pursued throughout each carrier's system to increase traffic levels and reduce costs, which, in essence, will lead to the achievement of adequate levels of revenue.

REVENUE ADEQUACY AND DIFFERENTIAL PRICING

As has been discussed above, the ICC was directed by Congress to establish standards and procedures for determining adequate levels of revenue for the nation's railroads with the enactment of the 4R Act. The Act established that these levels of revenue should be achieved:²⁰

... under honest, economical, and efficient management to cover total operating expenses, including depreciation and obsolescence, plus a fair, reasonable and economic profit or return (or both) on capital employed in the business.

In attempting to meet this mandate, the Commission accepted the argument made by the railroads for pricing certain movements, such as western coal, at levels higher than their cost. This differential pricing was allowed by the ICC on the grounds that rates on those market dominant movements had to be high enough to offer some contribution to system-wide overhead costs. The Commission determined that railroads should be able to price these types of remunerative services above fully allocated cost, if carriers were to be expected to overcome competitive situations elsewhere requiring pricing below that level.

Congress, in enacting the 4R Act, also set a goal of increasing the reliance on the marketplace for traffic considered not to be market dominant, rather than continuing unnecessary regulation. It was hoped that in a competitive setting, traffic would rely on market forces for the establishment of efficient price levels. Such action would allow for prices

*In its 1979 cost of capital determination, Ex Parte No. 353, *Adequacy of Railroad Revenue*, the Commission has arrived at an 11 percent cost of capital figure. This was determined under the same process using an embedded debt rate of 7.25 percent, a cost of equity capital of 13.5 percent, with a capital structure of 40 percent debt and 60 percent equity.¹⁸

to be set to cover the long-run marginal cost of a movement, an efficient level in terms of both shipper and carrier interests.

While the 4R Act did not specifically mandate the prevention of shipper abuse in market dominant situation, the IOC considered it to be as important as those more explicitly stated goals (see above, Ex Parte No. 338). It is essential that in a regulated setting, such as those involving the movement of market dominant western coal, captive shippers not be required to pay the entire amount necessary to subsidize those situations where goods are forced to move at prices below marginal costs.

This type of cross-subsidization between two movements is inherent in any setting that is totally regulated. Under common carrier obligations, a carrier is required to continue rail movements which may be unprofitable under prevailing rates. Yet, with a consistent application of a rate base-rate of return methodology for pricing under the regulated setting, carriers are guaranteed a limited level of profitability. It is in this type of regulated environment that price discrimination is justified. Some shippers are required to pay more for the movement of their particular goods than others. This is done to ensure average total income for the carrier is sufficient to cover system-wide costs. Shippers are protected from abuse by the carriers, as rates fall into a zone of reasonableness, while carriers are ensured the necessary incentives and sufficient capital funds to undertake new investments in profitable markets.

On the other hand, in a competitive setting, this sort of differential pricing is unjustifiable. With the presence of competition, specific service costs must be identified by each carrier, including those longer-run concerns involving expansion or replacement. As long as a carrier can enter any market and take away business from its competitors at rates that cover long-run incremental costs, efficiency in pricing for both carrier and shipper is afforded.²¹ Stated another way:²²

The marginal costs against which competitive rates should be judged are the costs of the company quoting or proposing to quote those rates, not the cost of their competitor. Effective competition and economic efficiency alike require that lower-cost firms be encouraged, because of their own lower costs, to reduce their prices to take business away from their higher cost competitors.

Low railroad profits and revenue levels

can be attacked in a competitive framework through the abandonment of those assets considered unprofitable. Without the common carrier obligation to serve those markets that have proven to require rates lower than the incremental cost of providing that service, the carrier can choose to either abandon that service or redeploy the assets to the more profitable coal movements. This type of action encourages increased efficiency and is a primary factor in addressing the carriers' concern for increased system revenues.

The current dilemma in railroad pricing arises from present public policy allowing carriers to charge what the traffic will bear on western coal and other market dominant commodities in order to subsidize less profitable non-coal service. The carriers argue that such action is necessary to bring their overall system rates of return on investment equal to the current cost of capital. The difficulty is that carriers are currently using the more profitable captive coal traffic to cross-subsidize movements of non-coal traffic in competitive markets. The result is that market dominant shippers are being forced to pay for non-regulated traffic that otherwise would not move, as prices are charged that would probably not cover the long-run incremental costs incurred in providing that service.

Such a policy raises several concerns about the role of carriers using cross-subsidies for competitive traffic to achieve adequate system earnings. First, there is a limit to the extent to which market dominant coal shippers can be expected to serve as the primary means for the carriers to meet their revenue requirements. Any price charged above the economic cost of service constitutes shipper abuse, which in any type of market setting is neither warranted nor desirable. This is especially important when it is remembered how rates influence the final number and location of industries and utilities served by railroads. The greater the uncertainty as to the rate policy followed by the railroads, the higher the cost to a shipper employing rail service and the greater the likelihood that shippers will adopt other means of transportation having more predictable costs.

A second consideration is the fact that cross-subsidization does nothing in terms of addressing the causes of carrier revenue deficiency. Subsidizing competitive rail movements by increasing rates on captive market shipments may create increased funding levels for reinvestment, at least in the short run. It will not, however, encourage a carrier to undertake new investments in market areas that are only marginally profitable.

Rather, these funds will likely be spent only on profitable investment opportunities in the carriers' operations, possibly resulting in increased investment risks for both competitive and market dominant traffic.

This, cross-subsidies of this type lead to severe distortions of the competitive marketplace. If a carrier is involved in both the movement of coal in a market dominant setting and non-coal goods in a more competitive environment, there is little reason to expect that carrier to operate with any degree of efficiency in the competitive framework. That carrier, through cross-subsidization, will likely operate at a very low efficiency level with complete knowledge that any financial shortfalls that result can be made up with revenues from captive coal movements. Such disregard for efficiency leads to the end of a competitive market setting, a situation that is beyond the control of the ICC. Regulation can prevent excess rates, but its ability to force carriers to adopt policies designed to promote efficient operations or acceptable service quality is severely limited.

Cross-subsidies of competitive traffic also encourage the potential for predatory pricing. In a competitive marketplace, it is not unlikely that a carrier will attempt to recapture lost markets by pricing below marginal cost, especially when it has the capability of making up the difference from revenues generated by captive coal traffic. This type of underpricing may allow access to those new markets temporarily, but over the longer run, the carrier will likely again lose that traffic to more efficient competing transportation modes.

Finally, it would seem as if this policy of allowing differential pricing in a competitive setting is approaching the railroad revenue problem in manner completely opposite of traditional theory. Historically in transportation, differential pricing has been such that high value goods tended to subsidize the movement of those items having lower value. Higher transportation costs could more easily be attached and hidden in those more costly goods, allowing for the subsidization of the lesser valued items, where the cost of movement constituted a relatively large portion of the total delivered price. With western coal movements, however, there seems to be an approach totally backwards of this, where the good of lower value is forced to subsidize those of higher value, and the captive shipper required to pay that difference.

In summary, the essential aspect of this discussion of the need for adequate railroad revenue is that regardless of

whether or not cross-subsidization from captive shipments, such as western coal, to less profitable competitive movements, makes economic sense, it is an undesirable policy to pursue. The use of such a pricing system is often destructive to not only the captive shipper, but the competitive environment and even the carrier, as well. It is not the use of cross-subsidies from market dominant western coal traffic to competitive markets that will increase the levels of carrier revenue, and the reasons for this have been briefly outlined in this paper. The only lasting means of attaining adequate revenue levels is through restructuring and the pursuance of an efficient pricing system. It is the carrier's obligation to not only the shippers that carrier serves, but to itself as well, to identify, finance and undertake those investments which can be expected to earn at least the current cost of capital. Over time, such action will encourage the development of a sound financial structure for the nation's railroads and make it profitable for them to make the necessary investments to adequately serve this country.

FOOTNOTES

- 1 U.S. Department of Transportation, *A Prospectus for Change in Freight Railroad Industry*, Washington, D.C.: October 1978, p. 76.
- 2 Ibid., p. 77.
- 3 Interstate Commerce Commission, *Ex Parte No. 338, Standards and Procedures for the Establishment of Adequate Railroad Revenue Levels*, Served on February 8, 1978, Washington, D.C., p. 8.
- 4 Ibid., p. 5.
- 5 Ibid., p. 7.
- 6 Ibid., p. 13.
- 7 Ibid., p. 24.
- 8 Ibid., p. 36.
- 9 Ibid., p. 35.
- 10 Interstate Commerce Commission, *Ex Parte No. 353, Adequacy of Railroad Revenue*, Served on December 5, 1978, Washington, D.C., p. 3.
- 11 Ibid., p. 5.
- 12 Ibid., p. 21.
- 13 Ibid., p. 24.
- 14 Ibid., p. 36.
- 15 Ibid.
- 16 Ibid., pp. 38-39.
- 17 Ibid., p. 39.
- 18 "13 Class I Roads Found to Be Earning Adequate Revenue by ICC's Standards," *Traffic World*, Vol. 181, No. 6, February 11, 1980, p. 49.
- 19 Interstate Commerce Commission, *Ex Parte No. 353, Adequacy of Railroad Revenue*, Served on March 27, 1979, Washington, D.C., p. 6.
- 20 Railroad Revitalization and Regulatory Reform Act, Section 205, 49 U.S.C. 1070 (a)(2).
- 21 Alfred E. Kahn, *The Economics of Regulation: Principles and Institutions*, New York: John Wiley and Sons, Inc., 1970, Vol. I, p. 162.
- 22 Ibid., p. 164.

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