

Effects on Motor-Carrier Operations of ICC Regulation of Operating Authority

William B. Tye and Joseph G. Altonji, Charles River Associates, Cambridge, Massachusetts

Paul O. Roberts and James T. Kneafsey, Cambridge Systematics, Inc., Cambridge, Massachusetts

Interviews with motor carriers and other data sources were used to assess the direct impact of federal regulation of motor-carrier operating authority on energy consumption and economic efficiency. The major conclusions of the study are that gateways are the principal restriction affecting regular-route carriers but that these carriers are the least restricted of the carrier classes with regard to operations within the areas they are authorized to serve. The operating authority of irregular-route specific-commodity carriers is substantially more restricted, but these carriers make more use of their options to avoid impacts on efficiency. Nevertheless, in some cases these options do not entirely offset the consequences of inadequate operating authority. Owner-operators make effective use of trip leasing to certificated carriers or haul exempt commodities to remain competitive despite their lack of operating authority. Restrictions on operating authority are partly responsible for the low load factors of private motor carriers, but private carriers still compete because of service and rate motivations.

Critics have long argued that federal regulatory restrictions on motor-carrier operating authority have reduced load factors and increased circuitry (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11). Energy consumption and economic efficiency in truck transportation are sensitive to load factor and circuitry of truck movements. Trucks frequently move empty, with less than full loads (12), and by circuitous routes. Regulation of motor-carrier operating authority imposes detailed operating restrictions on routes, cargo, equipment, points served, type of shippers, solicitation of backhaul cargo, leasing of equipment, and mixing of exempt, common, contract, and private carriage. If detailed regulation of operating authority accounts for the difference between the existing load factor and the circuitry of the industry and greater utilization of truck capacity, a significant energy and efficiency savings might be realized through modification of regulatory policies.

A review of the literature and the operating authorities of a sample of individual firms indicates that restrictions on operating authority are pervasive in the trucking industry (13). However, conclusions cannot be based on the mere existence of operating authority restrictions. The degree to which such restrictions affect efficiency depends on the economics of trucking, the objectives of the firm, and the carrier's ability to avoid the restrictions.

Because carriers who have certificates of public convenience and necessity have a common-carrier obligation to serve any shipper who requests service within their authority, carriers have an incentive to ask for no more authority than they intend to use (or sell). If service cannot be provided profitably, the carrier is motivated to apply for authority that excludes unprofitable service.

If the Interstate Commerce Commission (ICC) routinely approved every request for operating authority, it would be seen that many restrictions on the operating authority of carriers are restrictions on the common-carrier obligation and not necessarily on the efficient provision of service. Given that the award of authority imposes a legal obligation to serve, unrestricted operating authority is an unworkable concept. The real issues in a regulated industry with a common-carrier obligation are the criteria used in restricting certificates and the impacts of the restrictions on economic efficiency and energy consumption.

This paper is based on excerpts from a recent study of the energy impact of federal regulation of motor-carrier operating authorities (13), and readers are re-

ferred to that study for supporting data. The direct impacts on general economic efficiency of restrictions on operating authority are ordinarily related to those on energy efficiency. This paper reports only a qualitative assessment of the energy impacts, based primarily on a series of in-depth interviews with different categories of motor carriers.

The question involved is, To what extent is the present efficiency of truck transportation the result of ICC regulatory policies and to what extent is it a reflection of the fundamental economics of truck transportation? The standards against which the performance of the trucking industry should be measured are load factors and levels of circuitry that are economical in terms of energy constraints and service requirements.

RECENT CHANGES IN TRUCKING INDUSTRY STRUCTURE

A popular view of the U.S. domestic trucking industry has been that it is made up of two large sectors: ICC-regulated common carriers and fleets of private trucks. These sectors were complemented by intrastate carriage and local and farm trucking. The oil shortage of 1973 changed this view dramatically. For the first time, owner-operators were recognized as a growing and significant segment of the industry. Owner-operators became prominent during the national trucking strike, which was organized and carried out to dramatize the importance of "fuel price increase flow-through" clauses in the contracts under which these independent truckers operate.

Many of the independents drive their own trucks over 161 290 km/year (100 000 miles/year) and some achieve equipment utilizations of as much as 322 580 km/year (200 000 miles/year) by hauling agricultural exempt commodities or working on lease arrangements with ICC-authorized carriers (14). When lease arrangements are involved, it is common for the independent owner-operator to receive approximately 75 percent of the revenue and the carrier who holds the operating authority to receive the balance. The effective wage rates for lease arrangements of this type are lower than standard teamster union wages. As a result, independent and union operations are not ordinarily mixed. Use of owner-operators for less than truckload operations is difficult because dock workers in the terminals are typically organized and insist that teamster drivers operate under the labor agreements in force between the carrier and the local union chapter. The owner-operator thus usually hauls full truckloads for a contract trucker or an irregular-route common carrier or hauls agricultural exempt commodities for which terminal operations are unnecessary.

Low wage rates, high equipment utilization, and the avoidance of terminal handling costs by the owner-operator combine to produce a comparatively low-cost form of trucking. Wyckoff and Maister (14) estimate that the costs of owner-operator trucking are close to railroad tariff rates. Obviously, the costs vary across commodities and, for high-volume, low-value goods, rail rates are considerably lower. Nevertheless, owner-operators have begun to compete successfully for traditional rail traffic and to pose a competitive threat to

unionized regular-route carriers.

Specialized Carriers

Specific-commodity carriers, or irregular-route specific-commodity (IRSC) carriers, have operating authorities that are well suited to the use of leased drivers operating their own equipment. (Specific is used here rather than special because IRSC carriers often handle large amounts of general freight as well as commodities requiring specialized equipment, such as automobiles, bulk liquids, and machinery.) IRSC carriers ordinarily deal in truckload quantities for which terminal operations are unnecessary.

Regular-route authority, by contrast, is granted to scheduled common carriers of general freight who receive a large share of their revenue from less-than-truckload traffic. Regular-route common carriers of general freight typically do not employ owner-operators on a widespread basis. Private carriers are prohibited from leasing drivers who operate their own equipment. Of course, the agricultural exempt shippers also have direct access to the owner-operator.

As a result of these operating restrictions and institutional constraints, IRSC carriers have been in a position to exploit the economic advantages of the owner-operator. To circumvent problems posed by unionization, some regular-route carriers have formed special commodities divisions, which are segregated from the company's normal regular-route, less-than-truckload operations and tend to use the services of owner-operators almost exclusively.

Impact of Owner-Operators

The regular-route segment of the industry is losing market share (13, 15, 16, 17, 18), and the share of irregular-route carriers using nonspecialized equipment is growing at an annual rate of slightly less than 2 percent. Of course, regular-route carriers are experiencing absolute growth in traffic. However, total megagram-kilometers for specific commodity carriers now exceed amounts for regular-route carriers (this figure compares only the larger class 1 and 2 carriers and does not include the 12 000 or so smaller class 3 carriers).

Grant of Route Authority as a Mechanism of Change

ICC awards of operating authority have been favorable to the growth of the irregular-route carrier. The hearings require that an applicant prove public convenience and necessity before new authority is granted; substantial weight is given to the rights of existing carriers to the traffic that would be served by the new applicant. Carriers already serving the market strongly oppose the granting of new regular-route authority. The expedient way to acquire authority that would substantially extend the carrier's market area is to buy it from, or merge with, someone who already holds the authority. Awards of operating authority to regular-route carriers therefore tend to effect minor changes that do not materially affect competition. Irregular-route authority is easier to get precisely because it is so restricted. The wording of grants of irregular-route authority often specifies service from a single point (a city, a county, or in some cases a single plant) to points in a limited region (a state or a group of states) for a narrow range of commodities (the outputs or inputs of a single firm or industry). The service provided is for a single shipper or at most a narrow group of industries and gives the shipper low truckload rates for very specialized trans-

portation services. Competing carriers have been less successful in blocking these types of applications (13).

Although ICC certification policies have facilitated the growth of IRSC carriers, ICC is not solely responsible for this growth. IRSC carriers have also benefited from the increased competitive position of truckload transportation because of increases in the productivity of line-haul trucking, the decline of the railroads, the increased demand for service quality in intercity transportation, and IRSC access to owner-operator service. Nevertheless, an important policy issue is whether ICC, through its liberal policy toward awards of narrowly defined IRSC authority and its restrictive policy toward grants of broad authority, should continue to encourage recent trends in the trucking industry that enhance the role of the owner-operator and the irregular-route common and contract carrier. Part of this important issue is the potential for inefficiency caused by increased reliance on firms having highly circumscribed operating authority.

ANALYSIS OF THE EFFECTS OF FEDERAL REGULATORY POLICY

To assess the need for changes in regulatory policy, in-depth interviews were conducted with a sample of carriers. These data are synthesized with other data sources on the industry. The general approach of the analysis is to identify means by which carriers can avoid the inefficiencies caused by regulatory restrictions on operating authority and other related effects of regulation.

Detailed results of the interviews may be found elsewhere (13, Appendix D). In this paper, detailed case studies illustrating the conclusions are not presented. An attempt is made to assess operating authority restrictions qualitatively based on the interview data and other sources of information on the industry (15, 16, 17, 18, 19, 20, 21, 22).

An important issue in assessing the impact of regulation on energy consumption is the degree to which the inherent demand characteristics of trucking, rather than regulation, impose empty, circuitous truck movements. Data from reports by Bisselle (1) and Charles River Associates and Cambridge Systematics (13, Appendix A) and a 1972 continuous traffic survey by Central States Motor Freight Bureau and others suggest that both long-run (or net) imbalances and short-run, day-to-day (or stochastic) imbalances are important causes of empty truck movements and reduced load sizes.

The operating authority of each of the sampled carriers was studied in detail, and the resulting evidence (13, Appendix D) confirms the long-standing contention that there are restrictions in the operating authorities of motor carriers and that the type and frequency of the restrictions differ with the type of firm involved. These restrictions, in addition to the previously mentioned natural demand forces in the industry, are a potential cause of empty truck movements and circuitry. However, the degree to which these restrictions actually cause inefficiency in the industry depends on the options available to a carrier for easing the effect of the restrictions. A carrier can

1. Apply for new authority, merge, or purchase authority from other carriers,
2. Use a complementary provision in another operating authority already held by the firm,
3. Carry exempt commodities,
4. Trip lease equipment to a carrier who has the authority,
5. Interline shipments,
6. Engage in illegal operations, or
7. Engage in selective marketing.

The impact of restrictions on operating authority therefore depends on the extent to which the carrier is motivated to avoid the restrictions. Clearly, the more onerous a restriction is, the more highly motivated the carrier is to avoid it. The conclusion of the research is that each of the above options lessens inefficiencies but that a measurable level of restriction persists. The most significant restrictions, such as those affecting private carriage, cannot usually be avoided by these devices.

Applications for New Authority, Merger, or Purchase of Operating Authority

ICC policy has differed significantly in evaluating applications for regular-route general commodity (RRGC) authority and IRSC authority. IRSC authority has been awarded much more freely. Private carriers cannot secure authority to correct the inefficiencies imposed by regulatory restrictions unless they convert to regulated carriage or show that existing common carriers will not be injured.

Grants of RRGC Authority

The study interviews support the conclusion that ICC has been reluctant to grant regular-route general-commodity authority (23). With one exception, the firms interviewed acquired all major portions of their authority through "grandfather rights," purchases, or mergers. It is difficult for carriers to obtain large additions to their authority through application to the ICC because present regulations require them to prove that existing service is inadequate. An early ICC decision stated:

Existing motor carriers should normally be accorded the right to transport all traffic which they can handle adequately, efficiently, and economically in the territories served by them, as against any person now seeking to enter the field of motor carrier transportation in circumstances such as are here disclosed.

It is difficult to prove inadequate service over wide areas in which a number of competing firms have authority. The protests of other carriers are reflected in restrictions on commodities, intermediate points, off-route points, and plant sites. All the carriers interviewed indicated that they routinely protest applications affecting their market areas.

The direct impact of the restrictive policy on energy consumption hinges on whether regulatory policy has the primary effect of imposing inefficiencies on trucking firms in serving existing traffic or whether the restrictions limit the size of the market that may be served by a carrier. Effects of the first type have a measurable direct impact on energy efficiency.

The motivations of carriers in purchasing or merging to obtain additional authority were questioned in the interviews. The firms were asked whether they had expanded to increase the market area or to improve operating efficiency. The replies indicated that most of the purchases were made to expand the market area but that some purchases had made possible a significant improvement in efficiency. ICC does not generally approve mergers that will result in increased efficiency if the merger results in a new service and the existing service was adequate, e.g., if there is no evidence of significant interlining before the merger. Mergers may not be used to "tack" authorities to create a new service. If a new service is created it must pass basically the same test as an application for new authority. Thus, an efficiency test on existing traffic must be passed before the market share can be expanded (13).

Most of the interview evidence suggests that the restrictiveness of ICC policy on major grants of general-

commodity authorities primarily affects the size of the area that can be served directly by individual truck firms rather than operating efficiency within the areas they serve. Although limits on the number of new authorities raise the value of old certificates and raise the cost to carriers of acquisitions, some firms are able to purchase authority or merge with others if additional authority will permit economies.

Applications to improve a limited portion of a firm's authority (e.g., eliminate a gateway through an application for an alternate route for operating convenience only) are more successful than applications to improve a firm's overall operating efficiency through a large-scale expansion in the geographical or commodity scope of the firm's authority. Applications for additional authority and small additions through purchases appear to be important ways by which RRGC carriers can eliminate restrictions affecting portions of their authority.

To eliminate gateways (circuitous truck routes imposed by ICC regulation and resulting from the combination of two separate awards of operating authority), ICC has frequently granted authorities for alternate routes for operating convenience only. Most of the general-commodity carriers in the sample have obtained a number of these authorities. These firms were often able to eliminate gateways affecting traffic lanes in which they have significant market shares and traffic volume by applying for new authority. Some carriers, however, who served substantial traffic volumes through gateways experienced difficulties in getting authority. It is impractical to apply for additional routes for operating convenience only to cover the optimal routes between the points permitted in the firm's authority where truckload shipments occasionally arise and it is not necessary to go through a terminal point. The ICC superhighway deviation rules have improved the situation, but their impact is obviously limited by the highway network. Some unnecessary circuitry exists in RRGC operations, but it is difficult to determine how much.

Grants of IRSC Common-Carrier and Contract-Carrier Authority

The extent to which carriers are able to get IRSC common-carrier authority for points already served by other IRSC and RRGC carriers is not clear. Despite conflicting evidence from the interviews in this study, it is clear that irregular-route specific-commodity firms have been successful in expanding their authorities during the last 10 to 15 years (15, 16, 17, 18). This type of authority is much easier to obtain than regular-route authority, especially for points not served by other IRSC carriers. The interviews produced evidence that purchases and mergers are not as important for IRSC carriers as they are for RRGC carriers.

Because IRSC authority is very narrow in commodity coverage, is often limited to plant sites, and is frequently for one direction only, IRSC firms must possess combinations of these authorities if they are to achieve balanced traffic flows and minimize empty truck movements. Carriers may gradually increase their energy efficiency through a series of applications (the motivations of IRSC carrier applications appear to be both to improve traffic balance and to increase market size). At any point in time, however, there is significant variation in the scope of the authorities of individual firms in this sector of the trucking industry. Having to demonstrate a need for service to get new authority can therefore hinder IRSC carriers from achieving efficient traffic flows. However, the ICC gateway elimination ruling (25) has enabled irregular-route carriers to eliminate gateways resulting from the tacking of authority.

The carriers who are most disadvantaged by inade-

quate operating authority are those for whom a major restructuring of operations is necessary but impossible to achieve because the change in operating authority cannot be accomplished through application for minor changes. As a result, one firm in the sample continues to provide services that are not suited to the markets it serves.

Complementary Authority

This study produced considerable evidence that the various complementary authorities in a firm's overall certificate are important in achieving operating efficiency. Often an apparent restriction is not binding because of complementary authority elsewhere in the firm's operating authority. Carriers provided many examples of moving trucks laterally from a destination point under one authority to a nearby origin point under another authority. Complementary authority is probably more important for IRSC than for RRGC carriers; RRGC authority is typically bidirectional, covering all shipments that do not require special equipment. The narrow definition of individual grants of IRSC authority and the fact that such authorities are often for one direction only make it necessary to combine them with other authorities to achieve efficiency. The ability of IRSC common and contract carriers to combine separate authorities is important in reducing empty truck movements. Many of these firms could, however, benefit from broader grants of authority.

One large IRSC firm noted that its probability of obtaining a backhaul is proportional to restrictions on its authority in an area. Several firms interviewed noted that they experience empty truck movements in moving laterally from a destination point to the nearest authorized origin point rather than in returning from destination to origin.

Exempt Commodities

Many of the IRSC carriers interviewed cited hauling of exempt commodities as a means of reducing empty truck movements. The total amount of megagram-kilometers of exempt commodities accounted for by regulated truck firms is not clear, but apparently it is a relatively small percentage of the total. In 1969, farm, food, and similar products accounted for only 9.9 percent of the truckloads of class 1 carriers (24). Agricultural cooperatives, whose main business is exempt commodities, are permitted to ease their problems with empty truck movements by hauling some regulated commodities under certain conditions.

The ability of private carriers shipping primarily regulated commodities to compete for exempt commodities is not sufficient to enable those firms to balance movements. Many firms do not exercise this right in any case because movements of agricultural commodities tend to be seasonal and confined to specific geographical areas and thus their availability is limited.

Leasing

Leasing of drivers and equipment is potentially an important means of avoiding operating authority restrictions. Leasing is a way for regulated carriers without authority for a loaded movement in one direction to obtain traffic under another carrier's authority. More important, it is also a way in which regulated carriers can lease equipment one way from an owner-operator when a backhaul would be hard to fill. Interviews with RRGC and IRSC carriers indicate that the ability to use independent drivers on a short-term lease is important in avoiding empty truck movements and in serving traffic that the firm cannot balance by a return haul under its own authority (13). The independent drivers then seek

exempt traffic or arrange to sublease to another regulated carrier on return haul. One class 1 contract carrier stated that, because its existing authority is not broad enough to balance traffic between most points, it would have serious problems with empty truck movements if it were not permitted to trip lease to other carriers and to lease owner-operators. However, trip leasing between class 1 and class 2 IRSC common and contract carriers does not appear to be very common, partly because of institutional barriers and because of costs of arranging the agreements.

For independent drivers, who cannot haul regulated commodities except under lease to a regulated carrier, leasing is particularly important. The ability of uncertificated carriers to trip lease to regulated carriers and the authority of regulated firms to sublease owner-operators and permit them to haul exempt commodities give the independent driver considerable flexibility in obtaining regulated traffic.

The importance of trip leasing for general-commodity carriers is limited. The interviews found examples of general-commodity firms trip leasing vehicles and drivers to or from other firms. However, union rules against using independent drivers and a desire to maintain control over equipment limit the use of trip leasing by these firms.

Interlining

Interlining is sometimes used by regulated carriers (primarily RRGC carriers) to avoid circuitry in the firm's authority between points it is authorized to serve. It is also used to obtain access to markets for which the firm does not have authority and to enable the firm to improve its balance of traffic by avoiding traffic for which its direct authority is insufficient to maintain balance. Interlining, however, was not found to be a significant means of reducing imbalances and circuitry.

Illegal Operations

The larger number of firms in the industry and the decentralization of its activities have created enforcement problems for the regulatory agencies. The Bureau of Operations of the Interstate Commerce Commission is responsible for the enforcement of regulatory measures and auditing operations for over 15 000 regulated motor carriers. In addition, there are large numbers of private carriers and approximately 100 000 highly mobile owner-operators. Illegal operations are rarely detected, and the penalties for violation are not serious (14).

The interviewed firms were asked how frequently they detected illegal operations by their competitors. The replies suggest that illegal operations are relatively uncommon among general-commodity carriers, somewhat more common among IRSC carriers, and most common among private carriers and uncertificated for-hire carriers.

Marketing and Competition

The volume of traffic obtained by a given carrier over a portion of its authority is in part a function of marketing. Several RRGC firms noted that they engaged in selective marketing to balance traffic flows. Marketing is used to counter both long-run net imbalances and short-run stochastic imbalances in operations. In the first case, a firm's traffic may be imbalanced because the extent of the firm's authority in one area is greater than in another area and because the overall traffic between the specific points of authority is imbalanced. When the overall flow of traffic is imbalanced, marketing simply shifts empty backhaul between firms. When the imbalance experienced by one carrier is attributable to its

operating authority, however, marketing may reduce net imbalances experienced by the firm without shifting empty truck movements to other firms.

Competitive factors also tend to lessen the impact of operating authority restrictions. The energy efficiency of individual truck firms in handling traffic between certain points depends in part on their operating authorities. For example, as a result of regulation, one firm may have a circuitous route between two points while another firm has a direct route. The restriction in the authority of the first firm will affect energy use only if the firm successfully competes for traffic between the two points. Operating authority restrictions, by increasing circuitry and reducing load factors, also tend to raise line-haul costs. Thus, the market share of carriers having inefficient operating authorities will tend to be smaller than those having the most efficient authorities, if it is assumed that other factors determining costs are not systematically lower for the firms having inefficient authority.

The responses of firms in this study suggest that firms with serious gateway problems that have not been eliminated by certificates for operating convenience only or by other means carry a relatively small share of traffic in the affected markets. The allocation of traffic between firms thus reduces the impact of circuitous gateways on the authority of individual firms. However, most of the firms do serve some traffic between the points selected for analysis in the interviews, and it is obvious that gateways do have a detrimental impact on energy consumption.

REVIEW OF CURRENT REGULATORY DILEMMAS

Because operating authority restrictions impose some operating inefficiencies, the issue is how to take economic and energy efficiency into account in the process of awarding operating authority. Unfortunately it is exceedingly difficult, short of deregulation, to introduce efficiency as a consideration. Operating authority restrictions are "fingers in the dike" of the regulatory system. They have been designed to effect a structure of the industry, and the existing standard of public convenience and necessity is often difficult to compromise with efficiency considerations.

One expedient way of reducing the inefficiency imposed by operating authority restrictions would be for ICC to issue a ruling that reduces the restrictions inherent in existing authority. The ICC gateway elimination ruling (25) for irregular-route carriers is an example of such a modification. Improving the efficiency of the trucking industry by such means is attractive because it does not require carrier initiative in applying for authority. However, general rules easing restrictions in existing authorities will vastly increase the difficulty of securing new authorities under the existing ground rules. For example, a general ruling that eliminates commodity restrictions will make it impossible for carriers to use such restrictions as a means of reducing opposition to applications. Because of the emphasis placed by ICC on adverse impacts on existing carriers, such a ruling may in effect bring new authority awards to a standstill. Any change in the interpretation of existing authorities may require substantial procedural changes in the awarding of new authorities, which would create considerable opposition.

Restrictions on routes, gateways, and intermediate points serve a similar function. Why, it may be asked, would not everyone be better off if carriers were relieved of these restrictions? However, if these restrictions on regular-route carriers were eliminated, carriers could use a very simple initial network of authority (e.g., New York, Chicago, Los Angeles, Miami) to serve the entire country. Given the "slippery slope" inherent in

choosing any particular percentage limit for partially eliminating gateways, the potential for complete deregulation of RRGC carriers through gateway elimination is obvious. Such detailed restrictions on existing carriers perform a role in limiting entry that is no different from prohibition on entry by entirely new firms.

The basic problem is finding a middle-ground criterion for awarding operating authorities that balances the traditional ICC criteria and efficiency. Almost by definition, movements away from the criterion of the adequacy of existing service to a criterion of greater efficiency imply greater reliance on competitive forces, and grants of authority that improve the efficiency of one class of carriers will almost invariably have adverse impacts on other carriers. The choice, therefore, is to specify the circumstances when existing criteria should be rejected in favor of efficiency criteria. This may impose heavy litigation costs if the standard adopted is not so extensively applied that restrictions on entry become meaningless.

CONCLUSIONS

ICC regulations concerning motor-carrier operating authority specify detailed restrictions on routes, cargo, equipment, points served, type of shipper, solicitation of backhaul cargo, equipment leasing, and mixing of different types of operations for interstate motor carriers. Data collected in this study indicate that two segments of the industry whose operating authority is highly circumscribed—owner-operator carriers and irregular-route specific-commodity carriers (who frequently employ owner-operators)—are growing rapidly in comparison with other segments of the industry, especially regular-route common carriers. Because of this rapid growth, there is a danger that operating authority restrictions could become increasingly burdensome to the industry.

The degree to which restrictions affect efficiency depends on the economics of trucking, the objectives of the carriers, and the opportunities available to avoid the restrictions. Apparent restrictions in a firm's operating authority may not actually be constraining and may even be desired by the carrier. The interviews identified a substantial number of specific operating restrictions in the authorities of the sampled carriers and studied the effects of the restrictions on the carriers' operations. Options available to the carriers to avoid restrictions, such as applying for or purchasing new authority, using a complementary authority, hauling exempt commodities, and trip leasing, were examined in detail.

The principal operating authority restrictions affecting regular-route carriers are gateways, but these carriers are the least restricted of the carrier classes in the areas they are authorized to serve. Irregular-route specific-commodity carriers have substantially more restricted operating authority but make much more use of their options to avoid the impacts on efficiency of inadequate operating authority, especially options such as complementary operating authority, leasing of independent drivers, and hauling of exempt commodities. Despite the resourcefulness of the carriers, these options do not always offset the effects of inadequate operating authority. Owner-operators are highly effective in using trip leasing to certificated carriers or hauling exempt commodities to remain competitive, despite their lack of operating authority. Restrictions on operating authority are partly responsible for the low load factors of private motor carriers, but such carriers still compete because of service and rate motivations. Private motor carriers are disadvantaged the most by operating authority restrictions because they ordinarily enjoy few

of the options available to the other carriers to ease the effects of the restrictions.

This paper considers only the direct effects of operating authority restrictions on operating efficiency; it does not consider the indirect effects on the structure of the industry or on rate and service competition resulting from the entry constraints imposed by restrictions on operating authority.

ACKNOWLEDGMENTS

This paper is based on research conducted by Charles River Associates, Inc., and Cambridge Systematics, Inc., under the sponsorship of the Federal Energy Administration (FEA). The authors are indebted to Georgia Johnson of FEA, D. Daryl Wyckoff, Edward Margolin, Charles Taff, Robert F. Church, and James Sloss, who made numerous comments and criticisms on draft material. The authors also benefited from detailed comments on the overall research effort from the Bureau of Economics of the Interstate Commerce Commission and the American Trucking Associations, Inc. Ken Cone assisted in the collection of data on enforcement.

The views and conclusions stated here are ours and should not be interpreted as representing the official policies of the Federal Energy Administration.

REFERENCES

1. C. Anthony Bisselle. A Preliminary Assessment of Empty Miles Traveled by Selected Regulated Motor Carriers. Mitre Corp., McLean, Va., 1976.
2. Federal Regulatory Restrictions Upon Motor and Water Carriers. Board of Investigation and Research, 79th Congress, 1st Session, Senate Document 78, U.S. Government Printing Office, 1945.
3. James C. Nelson. The Effects of Entry Control in Surface Transport. In *Transportation Economics*, Columbia Univ. Press, New York, 1965.
4. The Regulatory Issues of Today. Interstate Commerce Commission, Jan. 1975.
5. Thomas Gale Moore. Freight Transportation Regulation. American Enterprise Institute for Public Policy Research, Washington, D.C., 1972.
6. Ann F. Friedlaender. The Dilemma of Freight Transport Regulation. Brookings Institution, Washington, D.C., 1969.
7. Larry Darby. An Evaluation of Federal Regulation of Common Motor Carriage. Indiana Univ., PhD thesis, Oct. 1969.
8. Ulpiano Ayala-Oramas. The Cost of Regulated Trucking. Department of Civil Engineering, MIT, PhD thesis, 1975.
9. Victoria Ann Daily. The Certificate Effect: The Impact of Federal Controls on the Growth of the Motor Common Carrier. Department of Economics, Univ. of Virginia, PhD thesis, 1973.
10. James Sloss. Regulation of Motor Freight Transportation: Quantitative Evaluation of Policy. *Bell Journal of Economics and Management Science*, Fall 1970, pp. 327-366.
11. Stuart Joy. Unregulated Load Haulage: The Australian Experience. *Oxford Economic Papers*, July 1964, pp. 275-285.
12. Edward Miller. Effects of Regulation on Truck Utilization. *Transportation Journal*, Fall 1973.
13. Charles River Associates and Cambridge Systematics. Potential Fuel Conservation Measures by Motor Carriers in the Intercity Freight Market. Federal Energy Administration, March 1977.
14. D. Daryl Wyckoff and David H. Maister. The Owner Operator. Heath, Lexington, Mass., 1974.
15. Charles Taff and David Rodriguez. An Analysis of Some Aspects of Operating Rights of Irregular Route Common Carriers. *Transportation Journal*, Winter 1975, pp. 31-42.
16. Charles A. Taff and David Rodriguez. A Study of Irregular Route Common Carriers of Freight and Their Competitive Impact on Railroads. College of Business and Management, Univ. of Maryland, College Park, informal paper, Aug. 1975.
17. Charles A. Taff. A Study of A-17 Irregular Route Motor Common Carriers of Freight: The Expansion and Scope of Their Operating Rights Since 1970. College of Business and Management, Univ. of Maryland, College Park, informal paper, June 1976.
18. Charles A. Taff. A Study of Operating Rights of Motor Contract Carriers of Freight and an Assessment of Their Competitive Impact on Railroads. College of Business and Management, Univ. of Maryland, College Park, informal paper, June 1976.
19. Robert F. Church. Effect of Certificate Restrictions on Operations of ICC-Regulated Motor Common Carriers. Transportation Systems Center, U.S. Department of Transportation, Cambridge, Mass., Report PM-SA-15, preliminary memorandum, Jan. 29, 1974.
20. Robert M. Sutton and others. Case Studies of Private Motor Carriage. Drake Sheahan/Steward Dougall Inc.; U.S. Department of Transportation, Nov. 1973.
21. Evaluation of Potential Changes to Federal Economic Regulations Governing Private Carriage. Drake Sheahan/Steward Dougall, Inc.; U.S. Department of Transportation, Dec. 6, 1974.
22. Profile of Motor Carriers of Property Industries Subject to ICC Regulation. Bureau of Economics, Interstate Commerce Commission, July 1965.
23. Accounting for Motor Carrier Operating Rights. American Trucking Associations, Inc., 1972.
24. Freight Commodity Statistics, 1969. Bureau of Accounts, Interstate Commerce Commission, pp. 2, 4, 9.
25. Interstate Commerce Commission. Gateway Elimination, Ex Parte No. 55 (Sub No. 8A), 119 M.C.C. §530 (1974) (49 CFRC §1065).

Publication of this paper sponsored by Committee on Taxation, Finance, and Pricing.

Analysis of Rail-Water Price Competition

Edward B. Hymson, U.S. Department of Transportation

The pricing debate between the water carriers and the railroads is examined. Water carriers assert that railroads discriminate against them in pricing, and railroads assert that they price in a manner that will permit them to hold on to traffic that would otherwise be lost to their unregu-

lated competitors. Both assert that their pricing practices benefit society. Competitive rail pricing practices and their effects on water carriers, shippers, railroads, and the general public are discussed.