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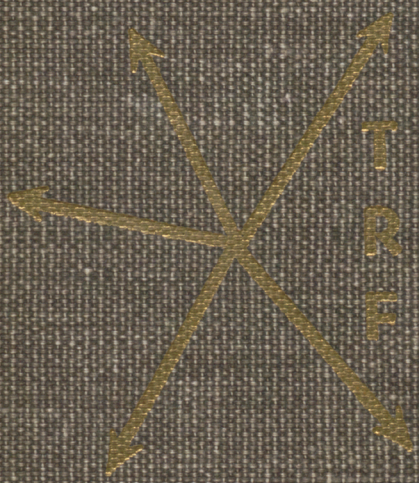

TRANSPORTATION RESEARCH FORUM

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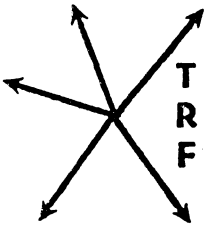

TRANSPORTATION RESEARCH FORUM

Implications of Motor Carrier Deregulation For A Case-Study Rural Community†

by Dale C. Anderson and Elmo Falcon***

ABSTRACT

PROPONENTS of motor carrier deregulation contend that the common carrier trucking industry would, in the absence of economic regulation, be highly competitive and far more efficient than at present. Deregulation would bring lower rates and improved service.

Opponents of deregulation contend that shippers in small, relatively isolated rural areas would suffer reductions in service and increases in rates. They maintain that such areas are presently cross-subsidized from revenues received from more remunerative intercity hauls.

Simulated deregulated conditions were compared with actual regulated conditions in a small rural community in south-eastern Nebraska. The community lacked rail service and was not served by major highways. Temporal and geographic flows, of commodities to and from the community were estimated based on personal interviews of local shippers and carriers. Carrier operating authorities were analyzed to establish the nature of regulatory limitations. Tariffs provided rates for the traffic in question. Costs of service under existing and simulated deregulated conditions were estimated from economic-engineering evidence.

Results indicate that, although route and commodity restrictions are not a source of inefficiency in the carriage of general commodity freight to the area, considerable potential for cost savings exists from consolidation of shipments and possibly from coordination of fore and back haul. Shipments at current rate levels are profitable, suggesting that cross-subsidization of this community by other areas is not an issue. The relatively high volume of private shipments suggests that lower rates might generate more traffic and more frequent service.

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INTRODUCTION

The provisions of the Motor Carrier act of 1935[1] and those of the more or less parallel statutes of most states[2] are regarded by many observers as having critical implications for shippers in small rural communities and for the carriers serving these communities. Rural areas are heavily dependent on motor carriers for their transportation needs. Many rural communities are without rail service and are entirely dependent upon motor vehicles for their freight service. With or without rail service, most small communities rely on motor carriers for meeting virtually all of their non-bulk transport requirements.

Federal and state laws empower regulatory agencies (the Interstate Commerce Commission at the Federal level, public service commissions at state level) to limit the commodities which common carrier truckers can haul and rates (minimum as well as maximum) they can charge. Routes the carriers must follow, points they must serve and frequency of service are prescribed. Control is exercised over entry of new firms and the merger activities of existing firms. Unprocessed agricultural products are generally exempt from regulation as are goods moved by private carriage. Private carriage may be a relatively poor alternative, however, since the transport requirements of most rural shippers are too modest to justify private vehicle ownership. Uncertified carriers of exempt products are not permitted to carry regulated products, even as backhauls. Most carriers of agricultural products outbound from rural areas thus have few opportunities for return hauls while, at the same time, regulated carriers have a preponderance of inbound traffic.

Proponents of continued regulation contend that shippers in small, relatively isolated areas would suffer reductions in services and increases in rates[3] in a deregulated environment. They maintain that such areas are presently cross-subsidized from revenues received from more remunerative intercity and interregional hauls.

Opponents of motor carrier regulation contend that the common carrier trucking industry would, in the absence of regulation, be highly competitive and far

more efficient than at present.[1] They maintain that the greater flexibility which deregulation would afford carriers would reduce transport costs and that the result would be lower rates and improved service to rural communities.

The purpose of the present study[5] was to measure the expected cost and service implications of motor carrier deregulation for a small, rural, case-study community. Estimated costs of existing common carrier service to the community were compared with publisher rates and with estimated costs under alternative deregulated conditions.

THE CASE-STUDY AREA

The focus of the study was on a community in south-eastern Nebraska. The economy of the surrounding mixed-farming area is largely agricultural. The community, population about 1200, has little manufacturing activity and exists largely as a commercial center. The community was selected for the likelihood that cross-subsidization of common carriage service would exist there if it exists anywhere.

The area is relatively remote from major centers of manufacturing and distribution. No rail lines or major highways serve the community. All freight service is provided by motor trucks. Although the volume of bulk agricultural products shipped from the area far exceeds the volume of inbound traffic, the outbound volume of regulated goods is inconsequential.

The community is served by an owner-operated motor common carrier of general freight which hauls approximately 87 percent of total for-hire regulated traffic to the case-study area. Two small-package common carriers account for the remaining 13 percent of the traffic. The general freight hauler provides LTL route-delivery service from Omaha and Lincoln origins, the consolidation points for most of the freight shipped to the community. Traffic coming from Kansas City is hauled by a large interstate common carrier to Lincoln and then transshipped to the area by the owner-operated carrier. Kansas City-Lincoln traffic moves in tractor-trailer vans. Most traffic from Lincoln and Omaha is carried in straight trucks over prescribed routes to the study community which is the final point served on each of the two routes.

RESEARCH PROCEDURES

Temporal and geographic flows of commodities carried in ordinary vans to and from the community were estimated based on personal interviews of local shippers and carriers. Owners or managers of all local commercial establishments provided monthly estimates of their transportation requirements for the most recent 12-month period. Data collected included volume, weight, destination or origin, commodity type or class, seasonality of the traffic and type of carrier (private or common). Excluded from the survey were commodities requiring refrigerated vans or other specialized types of equipment, even though some existing equipment specialization may have been prompted by the regulatory environment. Grain and livestock shipments were excluded from the survey even though their outbound volume is known to exceed by far the inbound volume of regulated products. Analysis of feasibility and costs of operating dual purpose vehicles designed to carry both bulk agricultural products and general freight was beyond the scope of the present study.

Operating authorities were analyzed to establish the nature of regulatory limitations imposed on common carriers serving the area. Further information came from carriers and shippers. Published tariffs provided rate information.

Costs of service under existing and simulated deregulated conditions were estimated from economic-engineering evidence.[6] Cost-output relationships of model firms were estimated and the resulting long- and short-run average costs were used as a basis for determining expected trucking costs under alternative regulatory situations. Information on carrier size, costs, service characteristics, load factors and general operating and management practices was obtained by telephone and personal interviews of the carriers serving the area.

Scale relationships were estimated from cost data obtained from a survey of 13 Nebraska common carriers of various sizes. In this latter phase of the analysis, intercity firms of four different sizes were modeled: 20-, 30-, 50- and 80-vehicle units, respectively. Three sizes of owner-operated route delivery firm were modeled: 2, 4- and 6-vehicle units, each. Cost estimates summarized in Tables 1-4 were used in calculating unit costs for the scale analysis and in structuring costs for each of the segments of the common carrier routes by which the study area is served.

Two carrier firm types were modeled to represent two basic types of service to the area: 1) An intercity LTL carrier operating tractor-trailer vans over a 700-mile (including pickup and delivery) round-trip route and 2) An owner-operated LTL, route-delivery carrier operating straight-truck vans over a 300-

TABLE 1

FIXED COSTS PER YEAR, MODEL INTERCITY TRUCKING FIRMS, NEBRASKA, 1980

Cost Item	Number of Units			
	20	30	50	80
Depreciation & interest	$290,490	$ 436,601	$ 737,382	$1,187,283
Taxes	12,301	18,570	32,121	52,964
Insurance	87,780	132,170	221,850	355,780
License & fees	10,030	15,077	25,169	40,213
Salaries	445,075	518,953	717,769	989,076
Gen. office expense	79,200	96,300	116,100	138,600
Total fixed cost/year	$924,876	$1,217,671	$1,850,391	$2,763,916

mile (including pickup and delivery) round-trip route. The former was representative of the firm providing the study area with connecting service from Kansas City to Lincoln. The latter firm was representative of the company providing the study area with route delivery service from Omaha and Lincoln. The model intercity carrier had 80 vehicles, while the owner-operated firm had four. Number of vehicles, however, is not a critical cost variable as the previously mentioned analysis of the sensitivity of average costs to firm size revealed.

Allowance was made for freight assembly costs at the point of origin and customer delivery costs at the destination of the intercity traffic; cost estimates thus reflect customer-to-customer rather than terminal-to-terminal costs.

TABLE 2

VARIABLE COSTS PER MILE, MODEL INTERCITY TRUCKING FIRMS, NEBRASKA, 1980

Cost Item	Semi-Trailer	Straight Truck
Drivers' wages	$0.248	$0.319
Gas/fuel	0.245	0.178
Tires	0.047	0.016
Oil	0.015	0.008
Maintenance	0.036	0.020
Miscellaneous	0.089	0.081
Total variable cost/mile	$0.680	$0.622

TABLE 3

FIXED COSTS, PER YEAR, MODEL OWNER-OPERATED TRUCKING FIRMS, NEBRASKA, 1980

Cost Item	Number of Units		
	2	4	6
Depreciation & interest	$22,689	$ 45,346	$ 67,513
Taxes	1,075	2,053	3,043
Insurance	8,233	16,374	24,535
License & fees	1,001	2,001	3,002
Salaries	59,748	108,246	148,016
Gen. office expense	6,000	12,000	18,000
Total fixed cost/year	$98,746	$186,020	$264,109

TABLE 4

VARIABLE COSTS PER MILE, MODEL OWNER-OPERATED TRUCKING FIRMS, NEBRASKA, 1980

Cost Item	Semi-Trailer	Straight Truck
Fuel	$0.260	$0.189
Tires	0.047	0.016
Oil	0.015	0.008
Maintenance	0.036	0.020
Miscellaneous	0.054	0.035
Total fixed cost/mile	$0.412	$0.268

The owner-operated firm provided largely an assembly/delivery service, but it, too, had a terminal in the study area and in some instances transferred incoming goods to a smaller truck for customer delivery.

Estimated costs of service under the present regulated system were compared with published rates to determine the profitability of each of the three traffic segments involved in service to the community. Average costs per cwt. were compared with the weighted average of published rates for the mix of commodities carried over each traffic segment. The results provide an indication of profitability of existing traffic.

Results of the economies of scale portion of the analysis support the view held by numerous investigators[7] that competitive pressures fostered by deregulation would yield cost savings by permitting improved coordination of backhaul traffic, by providing flexibility in traffic routing and, in the long run, the elimination of monopoly profits. Results of the rate-cost analysis suggested that monopoly profits accrue to firms operating in the present regulated environment.

Assuming that rates under deregulation would decline to the level of average costs, further analysis was performed to determine the expected level of costs, (and rates) if traffic presently moving to and from the area by private carrier were consolidated with that presently moving by common carriers. Only the private shipments of the local business firms were considered; no attempt was made to include shipments carried privately by the 1200 citizens of the community or by its surrounding farm population. Moreover, small package shipments (accounting for about 13 percent of the community's common carrier shipment volume) transported by two carriers providing this specialized service were also ignored. Inasmuch as the latter firms provide a door-to-door service available to all residents of the community, calculations beyond the scope of the present study would have been required in the simulation of costs of the service. Finally, no attempt was made to estimate the volume of new traffic which might be generated by rate reductions. Savings from deregulation are therefore based conservatively on effects of joining only a portion of presently-moving private traffic with that moving via existing common carriers.

Each carrier serving the area was authorized to carry general freight; commodity restrictions appeared not to be very limiting. Nor were the routes specified in carrier operating authorities an obvious source of inefficiency; existing routes appeared to be organized efficiently. No measure was attempted of potential savings from route enlargement or from ability to make permanent adjustments in the routes serviced. In the end, traffic consolidation was the source of cost savings modeled the most rigorously. The implied frequency of service for least-cost operations was determined, however, as was the cost of continuing present service levels under a deregulated/consolidated-traffic setting.

RESULTS

Inbound shipments of regulated goods to the study area consisted mainly of items falling in four major commodity areas: (1) general merchandise such as garments and textiles, (2) appliances and furniture, (3) building materials such as tile and carpeting, and (4) automobile and implement parts.

Seasonality of traffic varied from one haul to another. Traffic from Lincoln, including transshipments from Kansas City, had only minor seasonal fluctuations. Traffic from Omaha was more seasonal, volume ranging from 88 per cent of mean volume during spring and fall months, to 112 percent during the winter and summer.

There were very modest economies of size, stemming entirely from savings in terminal costs, in both the intercity and route-delivery operations. The smallest size intercity carrier (20 vehicle units), with a round-trip load factor of 65 percent, and traveling a round-trip route of 700 miles, five days per week, had average costs of $1.94/cwt. The largest size modeled (80 vehicle units) had costs of $1.73 under otherwise identical conditions, a savings of 21¢/cwt. or 11 percent (Figure 1).

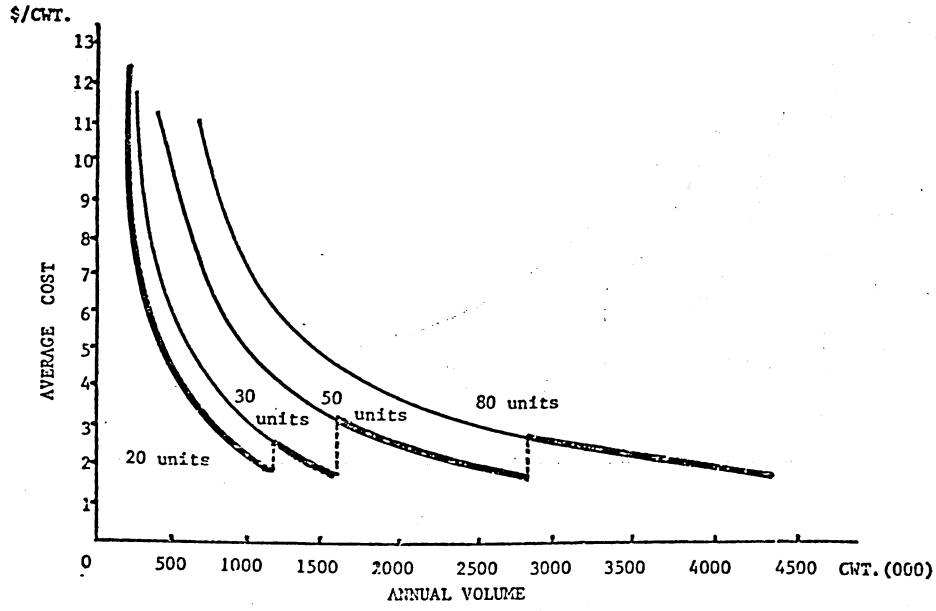

FIGURE 1

Cost-volume relationships for alternative sizes (number of vehicle units) and volumes (load factors) of intercity trucking firms, average round-trip haul of 700 miles, Nebraska, 1980.

Size economies for the owner-operator, route-delivery carriers were less significant owing to the inherently localized nature of their operations and to the relative unimportance of terminal activities. Costs for a two-vehicle firm with a 42.5-percent load factor (85 percent forward haul and zero backhaul), round-trip of 300 miles, operating five days per week, were $1.78/cwt. (Figure 2). An otherwise similar six-vehicle firm had costs of $1.63 for a savings of 15¢/cwt. (8 percent).

Changing the load factor had a more pronounced effect on average costs. Reducing the load factor for the largest (80-unit) intercity carrier from 65 percent to 30 percent of capacity increased costs from $1.94 to $4.21 per cwt. (Figure 1). The six-vehicle, route-delivery carrier had average costs of $1.78/cwt. when load factor was 42.5 percent, $3.80 when the load actor was reduced to 20 percent, a 113 percent increase in costs (Figure 2).

Estimated costs of common carrier service to the study area, including costs of freight assembly at the origin and delivery at destination, over each of the traffic segments, are summarized in Table 5. Costs for the Kansas City to Lincoln segment were lowest ($2.29 per cwt.), even though the segment is the longest of the four, owing to the larger vehicles used for this haul and to the higher vehicle load factor, especially on the backhaul to Kansas City. Costs of moving goods to the study area ranged from $3.08/cwt. from Lincoln to $6.18 from Kansas City (via Lincoln).

Published rates ranged from $5.19/cwt. for Lincoln-Study Area to $8.74 for the Kansas City-Study Area haul — higher in every case than costs. The differential was widest for the Kansas City-Lincoln haul where rates were 382 percent of costs and lowest for the Lincoln-Study Area and the Kansas City-Study Area segments where rates were 133 percent of costs.

A modest reduction in costs could be effected, assuming traffic flows were not adversely affected, by reducing the frequency of service over each of the segments (Table 5). A reduction in service from five days to three days per week over the Omaha-to-Study route would reduce costs by 21¢/cwt. (7 percent), while cutting service from Kansas City to Lincoln from five days to 3-4 days per week would save 26¢/cwt. (11 percent). Reducing service from Lincoln to the study area from five days per week to only two days would save 17¢ (percent).

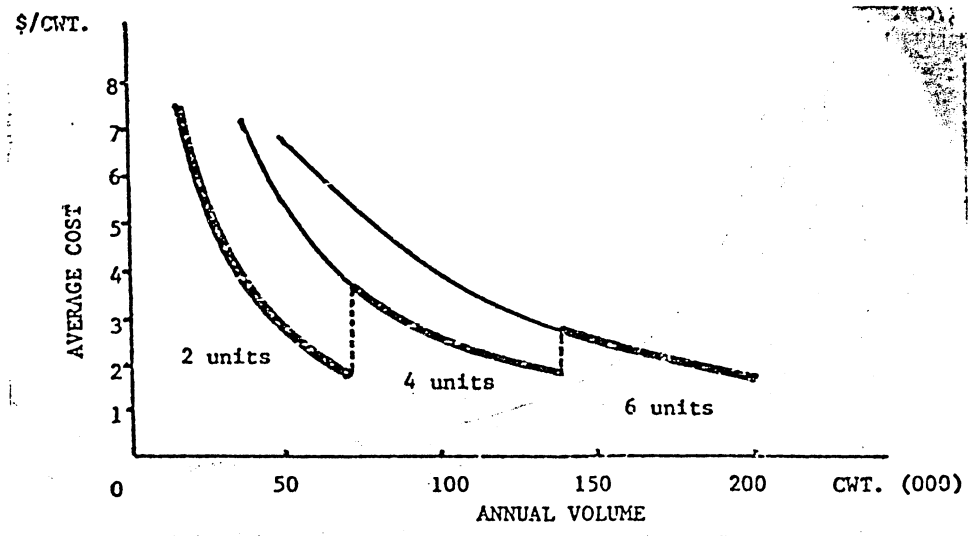

FIGURE 2

Cost-volume relationships for alternative sizes (number of vehicle units) and volumes (load factors) of owner-operated trucking firms, average round-trip haul of 300 miles, Nebraska, 1980.

Consolidation of private traffic with that moving by common carrier would increase traffic sufficiently to restore minimum-cost service to levels existing under the present system except for the Omaha-Study Area segment where least-cost service would be effected by three rather than five trips per week (Table 1). Such consolidation of traffic reduced costs for the Omaha-Study Area haul by 57¢/cwt. (19 percent) if service were also reduced, by 38¢/cwt. (12 percent) if existing service levels were maintained. Consolidation yielded relatively larger benefits for the other segments: 50¢/cwt. (22 percent) for Kansas City-Lincoln, $1.92 (49 percent) for Lincoln-Study Area and $2.42 (39 percent) for Kansas City-Study Area, all of the latter at original service levels.

Consolidation of private and common carrier traffic would improve carriers' load factors and yield substantial cost savings, even at current service levels. There is potential, however, for further savings from a relaxation of regulatory restrictions. Temporal rate variability might reduce seasonal fluctuations in traffic. The ability to enlarge the geographic scope of carrier operating authorities might improve load factors and perhaps increase frequency of service as well. Finally, backhauls for general freight carriers might be increased substantially if shipments of agricultural products could be coordinated with inbound freight deliveries.

The potential for effecting such savings was not measured in the present study, although it was possible to calculate costs for conditions under which private and common carrier shipments were consolidated and where underutilized resources were assumed to shift to other markets. Such adjustments would yield cost savings, as compared with the present regulated system, ranging from 50¢/cwt. (22 percent) for the Kansas City to Lincoln segment to $2.14 (55 percent) for the Lincoln to Study Area haul and $2.53 (41 percent) for Kansas City to Study Area.

IMPLICATIONS

Results of the study suggest that costs of general freight transportation service to a small, rural, and geographically remote area in south-eastern Nebraska might be reduced substantially if local commercial traffic now shipped privately were combined with common carrier traffic. Cost savings ranging from 12 to 49 percent, depending on the origin of the shipments, are possible without reductions in service. Additional savings of as much as 10 percent would result from carriers being able to shift seasonally underutilized resources to

TABLE 5

	Regulatory Model			
	Present Regulated System	Reduced Service	Consolidated Traffic	Intermarket Transfer
Traffic Segment				
Omaha - Study Area				
Rate ($/cwt)	5.45			
Average cost ($/cwt)	3.06	2.85	2.49 (2.68)*	1.85
Service (trips/week)	5	2-4	2-4	2.04
Lincoln - Study Area				
Rate ($/cwt)	5.19			
Average cost ($/cwt)	3.89	3.72	1.97	1.75
Service (trips/week)	3	1-2	3-5	3-5
Kansas City - Lincoln				
Rate ($/cwt)	8.74			
Average cost ($/cwt)	2.29	2.03	1.79	1.79
Service (trips/week)	5	3-4	5	5
Kansas City - Study Area				
Rate ($/cwt)	8.25			
Average cost ($/cwt)	6.18	5.75	3.76	3.54
Service (trips/week)	3-5	3-4	3-5	3-5

* Cost if existing level of service of 5 trips/week is maintained.

Published rates, costs and levels of service under existing regulated system compared with costs and service under selected alternatives, case-study area, Nebraska, 1980.

other markets. Further savings might accrue from coordinating backhauls of agricultural products with inshipments of general freight and from enlargement or rationalization of route territories. Neither of these latter possibilities was examined in the present study.

Although average load factors for carriers presently operating in the area generally ranged from 50 to 60 percent on forward hauls and from zero to 34 percent on backhauls, traffic over each of the routes by which the community was served was profitable. Accrual of monopoly profits to carriers serving this low-density area casts doubt on the contention that rural shippers are the beneficiaries of cross - subsidization. Rates which exceed full costs by 33 to 282 percent for service to an area chosen for its likelihood of not being able to provide remunerative traffic suggest that attracting carrier service to such areas in a deregulated market environment should be no problem. Cost reductions fostered by deregulation would provide further incentives for service.

FOOTNOTES

1 49 Stat. 543 (August 9, 1935), 49 Code Section 301 et seq., as amended. Passage of the Motor Carrier Act of 1980, along with a relaxation of rule-making practices by the Interstate Commerce Commission, may have made entry into the trucking industry somewhat easier than previously. Most of the basic provisions of the Act of 1935 still apply, however.

2 Provisions of the Nebraska law are similar to those of the Federal Act. See Nebraska Revised Statutes, Sections 75-118 to 75-134 and 75-301 to 75-332.01 (Reissue 1976 and Cumulative Supplement 1980).

3 See, for example, Nicholas A. Glaskowsky, Jr., Brian F. O'Neil and Donald R. Hudson, **Motor Carrier Regulation: A Review and Evalu-**

ation of Three Major Current Regulatory Issues Relating to the Interstate Common Carrier Trucking Industry (Washington, D.C.: ATA Foundation, 1976), pp. 12-15.

4 For a statement of this position see John W. Snow, "The Problem of Motor Carrier Regulation and the Ford Administration's Proposal for Reform" in Paul W. MacAvoy and John W. Snow, **Regulation of Entry and Pricing in Truck Transportation** (Washington, D.C.: American Enterprise Institute, 1977), pp. 27-33.

5 A more detailed account of the procedures and findings is found in Elmo Falco, "Impact of Motor Carrier Deregulation on a Small Rural Community—A Case Study," unpublished M.S. thesis, University of Nebraska, Lincoln, 1981, 106 pp.

6 For discussions of the theoretical and procedural bases for economic-engineering cost-finding techniques, see Ben C. French, "The Analysis of Productive Efficiency in Agricultural Marketing: Models, Methods, and Progress," in Lee R. Martin, editor, **A Survey of Agricultural Economics Literature**, Vol. I (Minneapolis Press), 1977, pp. 97-120 and 132-41; and Dale G. Anderson and Delmer L. Helgeson, Problems and Techniques of Intra-Firm Cost Identification and Analysis: Multi-Product and Multi-Service Suppliers," in Paul E. Nelson, Jr., editor, **Farm/Ranch Input Research—Yesterday, Today and Tomorrow**, North Central Regional Research Publication 215 and Michigan State Agricultural Experiment Station Research Report 208 (East Lansing: Michigan State University), 1973, pp. 117-43.

7 See, for example, John Richard Felton, "The Costs and Benefits of Motor Truck Regulation," **The Quarterly Review of Economics and Business**, Vol. 18, No. 2 (Summer 1978), pp. 7-20; Thomas Gale Moore, **Trucking Regulation: Lessons from Europe** (Washington: American Enterprise Institute, 1976); Richard N. Farmer, "The Case for Unregulated Truck Transportation," **Journal of Farm Economics**, Vol. 46, No. 2 (May 1964), pp. 398-409; and J. R. Snitzler and R. J. Byrne, **Interstate Trucking of Fresh and Frozen Poultry Under Agricultural Exemption**, Marketing Research Report No. 224 (Washington: U.S. Department of Agriculture, 1958).