

Freight Transport Regulation
Equity, Efficiency, and Competition in the
Rail and Trucking Industries

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Regulation and Regulatory Reform: An Overview

1.1 Transport Regulation and Regulatory Analysis

Freight transportation historically has been one of the most heavily regulated sectors in the American economy. The Interstate Commerce Act of 1887 introduced economic regulation as a policy tool and brought rail rates under extensive controls to limit discriminatory pricing practices concerning persons, localities, routes, and traffic. This structure was subsequently extended to for-hire motor carriers and barge operators so that the bulk of intercity freight transportation is presently regulated in accordance with the structure of the original Interstate Commerce Act.¹ Thus not only are rates, routes, entry, merger, and abandonments currently closely monitored in the rail, trucking, and barge industries, but also the existing regulatory restrictions have paralleled closely those of the initial act. Consequently, even though the Interstate Commerce Act has been extensively amended in the ninety-plus years since its initial passage, the form and intent of regulatory restrictions have remained remarkably consistent during this period.

The forces behind the passage of the initial act of 1887 and its subsequent application have been extensively explored, and there are a number of somewhat contradictory hypotheses concerning them.² Perhaps the most appealing of these is the hypothesis that at its initial inception, regulation jointly served the interests of the railroads on the one hand, which were suffering from excess capacity, rate wars, and highly unstable profits, and the interests of the expanding agricultural population on the other, which was suffering from discriminatory pricing practices and excessive rates. Consequently, the railroads accepted regulation to ensure stability and orderly growth, while the agricultural interests actively sought regulation to protect them from the monopolistic exploitation of the railroads.

The Interstate Commerce Act of 1887 specifically required rates to be “just and reasonable,” while prohibiting undue preference between persons, localities, and types of services, and the practice of charging more for a long haul than a short haul over a common line. However, while prohibiting all forms of personal price discrimination the act made no mention of commodity price discrimination, and value-of-service pricing rapidly achieved official sanction from the Interstate Commerce Com-

mission (ICC).³ Thus the rate structure was such that railroads treated shippers more or less equally with respect to their size and location, while receiving relatively high margins on high-value manufactured commodities and relatively low margins on low-value bulk and agricultural commodities.

At its time of inception, this policy made sense. It served the agricultural and populist interests by ensuring that rates for their commodities would be kept low and ensuring that the farmers and homesteaders would not see any potential economic rent expropriated by the railroads. It served the interests of the railroads by ending the instabilities caused by the frequent rate wars and by ensuring relatively stable profit levels through the high returns received on high-value manufactured commodities. Indeed, subject to the restriction upon personal price discrimination imposed by the act, it is likely that the value-of-service rate structure was also the profit-maximizing rate structure for the railroads. Moreover, since the demand for manufactured commodities was quite inelastic at that time, relatively little resource misallocation should have resulted from this pricing structure.

While many changes have taken place in the structure of the Interstate Commerce Act since its passage in 1887, three aspects have remained essentially constant:

Prohibition of personal price discrimination.

Value-of-service pricing.

Maintenance of carrier profitability.

Of these, the prohibition of personal price discrimination is probably the least controversial since it meets generally held standards of fairness and equity. Insofar, however, as economies of large-volume shipment exist, the requirement that rates be the same to large and small shippers or the requirement that rates be the same on high-density routes as low-density routes may in fact reflect discrimination in favor of low-density, rural shippers. This, of course, is entirely consistent with the populist intent of the value-of-service rate structure.

The Hoch-Smith Resolution, passed by Congress in 1925, explicitly required the ICC to give consideration to the relationship between agricultural freight rates and agricultural incomes and has been interpreted as giving clear legislative sanction to the maintenance of the value-of-service rate structure.⁴ Consequently, the response to pressures that might lead to a change in the freight rate structure has been to extend regulation. Thus when the railroads were faced with an erosion of their

high-value traffic by trucks, regulation was extended to motor carriers in 1935. Similarly, when water competition threatened to reduce the profitability of low-value shipments and put pressures on the railroads to increase rates on their captive bulk traffic, regulation was extended to barges in 1940. Since World War II, the ICC has carefully monitored minimum rate levels on water-competitive traffic to ensure that rail profitability is maintained at sufficiently high levels to preclude upward pressures on the rates of captive bulk traffic.⁵

Finally, while perhaps less obvious, the maintenance of carrier profitability has played an important role in regulatory policy. It is not a coincidence that regulation was instituted during a period of extreme rail instability and rate wars or that regulation was extended to motor carriers during a period of "excessive" competition and bankruptcies during the Great Depression. When faced with considerable excess capacity and the associated pressures to price down to short-run marginal costs, firms tend to attempt cartelization to maintain industry stability. Since, however, the same pressures that lead to rate cutting and rate wars also make policing the cartel difficult, regulation presents an attractive alternative. Carriers accept a perhaps somewhat reduced expectation of long-run profits for a reduction of their variance, while society is willing to guarantee the carriers relatively stable profits in exchange for the maintenance of a rate structure that may not be entirely consistent with the profit-maximizing behavior of the carriers.

Thus over the past ninety years a rather symbiotic arrangement has evolved among small rural shippers, agricultural interests, railroads, and trucking firms, in which each has accepted certain costs in exchange for other benefits. The rural and agricultural interests have accepted higher freight rates and prices on manufactured commodities in exchange for relatively low rates on the commodities they ship. The railroads have accepted low freight rates on agricultural commodities in exchange for high rates on manufactured goods. Trucking firms have accepted relatively low rates to low-density rural areas in exchange for the umbrella provided by the value-of-service rate structure and the industry stability and profitability provided by regulation. Thus while no one group is a clear winner, on balance each feels that its real income is higher as a result of regulation than it would be in its absence.

Since the agricultural and rural interests were a formidable political force in the late nineteenth and early twentieth centuries, it is not surprising that the coalition between the carriers and these interests survived at that time. What is surprising, however, is that well into the last quarter

of the twentieth century, transportation regulation has existed in a form and intent that is basically unchanged from its inception. In view of the basic changes that have taken place in American society over the past ninety years, it is certainly reasonable to ask whether social and political institutions that were applicable at the turn of the century are still applicable. To state the question baldly: Are the benefits conferred by regulation upon the carriers and the rural and agricultural interests sufficiently great to warrant the costs in terms of resource misallocation that are generated by regulation?

Over the past twenty years economists have become increasingly critical of transport regulation. The issue was first raised by John Meyer and his associates (1959), who argued that the value-of-service rate structure imposed considerable costs upon society by encouraging shipments to go by truck, which had a distinct service advantage, instead of by rail, which was prohibited from practicing price competition. In addition, since the common carrier obligations imposed upon railroads and trucks made them maintain sufficient capacity to meet the demands of low-density shippers, the carriers were not able to adjust their capacity in an optimal fashion and were thus forced to operate with an inefficiently large plant. In addition, it is often argued that regulation and the ensuing cartelization of the rail and trucking industries have tended to blunt innovative initiatives so that the productivity growth in the rail and trucking industries has been less than it otherwise might have been.⁶ Finally, it is also argued that the cartelization of these industries has enabled labor to obtain higher wage settlements than those achieved in more competitive industries.⁷ Thus it is claimed that the potential benefits of regulation that accrue to carrier management have at least partially been extended to labor, with a consequent broadening of support for continued regulation.

In recent years a voluminous literature has developed attempting to quantify the costs that transport regulation imposes upon society.⁸ While the specific methodologies differ substantially, and the magnitudes of the estimated costs vary, the conventional wisdom is that these costs are substantial. Indeed, related exercises with respect to the air industry encouraged the recently passed air deregulation bill⁹ and have considerably strengthened the case for deregulation in the surface freight industries.

Pressures for deregulation in the surface freight industries are particularly strong. A regulatory reform bill for the trucking industry was passed in the summer of 1980, and similar legislation is likely to be passed

for the rail industry before the end of 1980. While the deregulation embodied in both the rail and trucking bills is relatively modest, it nevertheless marks a significant departure from existing restrictions upon rate freedom, entry, and abandonment and thus gives firms in these industries considerably more incentive to act in a competitive fashion than they previously have had.

The pressures for deregulation have come from several sources. The recent experience of the airlines suggests that deregulation does not necessarily lead to Armageddon. In addition, the inability of the railroads to utilize fully the band of rate freedom legislated under the 4-R Act,¹⁰ in conjunction with their increasing financial plight, has caused the railroads to look with increasing favor upon deregulation. Indeed, prominent rail spokesmen have pushed strenuously for relaxation of restrictions with respect to rates, mergers, and abandonments.¹¹ Finally, with a number of new appointments, the ICC recently has been transformed from a staunch supporter of the regulatory status quo to a leadership position with respect to regulatory reform.

Nevertheless, concerns about deregulation remain extremely strong. Motor carriers continue to believe that "destructive" competition would ensue in the advent of deregulation, and small rural shippers and agricultural interests feel that deregulation would lead to substantial rate increases and a consequent reduction in real income. Thus conventional wisdom holds that deregulation would impose substantial and specific costs upon the existing beneficiaries of regulation.

However, in considering the potential costs that deregulation might impose upon its presumed beneficiaries, it is important to note that the world is not static. Fundamental changes have occurred in the transportation industries in the twenty years since Meyer and his associates wrote their pioneering work that may substantially affect the magnitudes of the costs and benefits of continued transport regulation.

In particular, the virtual completion of the Interstate Highway System has meant that truck transportation presents a viable, if somewhat more expensive, alternative to rail transportation for agricultural commodities that were formerly considered as captive rail shipments. In addition, the Interstate Highway System has permitted trucks to utilize larger loads and achieve higher speeds and thus to become increasingly competitive with rail. Wyckoff and Maister (1977) have estimated that efficient truckload operations are in fact no more costly than rail.

The growth of truckload trucking operations has also had an impact

upon the trucking markets, which in fact are increasingly dichotomized between carriers of general commodities, which largely perform a consolidation service and concentrate on less-than-truckload (LTL) operations, and the carriers of specialized commodities, which perform platform-to-platform, full-truckload (TL) services. Since the markets and technologies of these two types of carriers are very different, it would clearly be a mistake to treat trucking as a homogeneous entity. Indeed, the implications of deregulation in the truckload and LTL markets are very different and must be analyzed accordingly.

1.2 Analyzing Regulatory Reform

In view of these fundamental changes that have taken place in the transportation markets in the past few years, it may be desirable to reassess the impact of regulation upon the carriers and shippers to see whether the allocational costs and distributional benefits are in fact as large as they are generally believed to be.

In this connection, however, it is important to realize that regulation is not a single policy, but is actually a number of specific policies concerning rates, routes, mergers, abandonments, etc., on the affected modes. Of these, the following are probably the most important:

The maintenance of the value-of-service rate structure.

Railroad abandonment and infrastructure maintenance.

The maintenance of common carrier trucking obligations to light-density rural areas.

Value-of-service pricing The importance of the maintenance of the value-of-service rate structure should be clear from the preceding discussion. Indeed, one can argue that its maintenance has formed one of the principal cornerstones of regulatory policy and has been a prime determinant in ICC decisions concerning minimum rates, umbrella pricing, and market dominance. Thus the value-of-service rate structure has been a major topic of analysis by economists and others concerned with the implications of regulation, and most of the alleged costs and benefits of transport regulation can be attributed, either directly or indirectly, to the maintenance of this rate structure.¹²

If in fact, however, truckload operations are competitive with rail operations, and inland agricultural shippers have viable alternatives to rail, the potential resource misallocations resulting from the value-of-service pricing structure become considerably less, while the potential costs of

eliminating it also become considerably less. Thus it is entirely possible that the maintenance of the value-of-service pricing structure is a nonissue: if truckload operations are really competitive with rail for high-valued manufactured traffic, then the bulk of this traffic should probably go by truck, and the current traffic allocation may in fact be too heavily oriented to rail; if truckload operations are really competitive with rail for agricultural shipments, then the railroads have little latent monopoly power with respect to inland agricultural shippers, and few income losses should accrue to these shippers in the absence of regulation.

Consequently, to analyze the implications of the maintenance of the value-of-service rate structure, it is essential to focus upon truckload (TL) trucking operations instead of less-than-truckload trucking (LTL) operations. Although Wyckoff and Maister (1975, 1977) have highlighted the role of TL operations, their implications for rail-truck competition and resource allocation have not been fully explored. Indeed, once the full implications of this form of competition have been explored, it may be the case that efficiency requires further curtailment of rail operations rather than their expansion.

In addition, to the extent that truck competition has acted as a constraint upon the railroads with respect to their pricing of high-value manufactured goods, it may be that the value-of-service rate structure is no longer applicable in the sense that rates may actually be higher relative to marginal costs on bulk commodities than on manufactured goods. In this case the presumed cross subsidy from manufactured to bulk commodities would no longer exist. Indeed, in this case, abandonment of value-of-service pricing might actually favor shippers of bulk commodities more than shippers of manufactured goods.

Moreover, the analysis of rail-truck competition has usually been couched in terms of a partial equilibrium analysis, in which measures of traffic misallocation have been made at existing rate levels, rather than at the rate levels that would exist in a competitive equilibrium. If all trucking and rail operations took place at constant marginal costs, measures of misallocation based on existing rates and costs would be meaningful. Since, however, rail and trucking costs are not constant, the final competitive equilibrium may look quite different from that implied by existing rates and costs. This problem is compounded when one realizes that rail and trucking demands depend on rail and trucking rates and shipment characteristics, and that rail and trucking costs depend upon the composition of shipments. Thus, for example, changes in rail rates on manufactured goods will lead to shifts in trucking demand functions, and the

resulting output shifts in each mode will lead to further shifts in the marginal costs of each mode. Thus a partial equilibrium analysis will fail to capture the full nature of rail-truck competition and a general equilibrium analysis is required.

Finally, since the policymakers clearly weight carrier and shipper income losses fairly heavily in their decisionmaking process, rational discourse requires some effort to assess the income costs of policy changes. Thus analyses of deregulation must be able to translate rate changes into income changes that would affect shippers and carriers. Consequently, it is necessary to build models that relate rate changes to regional income changes as well as to changes in carrier profitability.

Consequently, the primary focus of this study will be to perform a full general equilibrium analysis of the competitive equilibrium that would exist between rail and truckload trucking operations with respect to bulk and manufactured commodities. By comparing this with the existing equilibrium, it should be possible to assess the efficiency costs of maintaining the existing rate structure as well as its impact upon carrier profitability and regional income levels.

Of course, it is important to stress that a competitive equilibrium is not necessarily the presumed outcome of deregulation and the abandonment of the value-of-service rate structure. Oligopoly and monopolistic competition are the structural norms of American industry, and it is likely that they would also characterize a deregulated transportation industry. Nevertheless, since competition is the relevant efficiency norm, it is useful to evaluate the value-of-service rate structure using it as a standard. Moreover, in establishing the nature of the competitive equilibrium it should also be possible to consider the forces that would tend to push the transportation industries toward it or away from it in the absence of the value-of-service rate structure.

Railroad abandonment and infrastructure maintenance While regulatory policy has traditionally focused upon the value-of-service rate structure, the increasing financial plight of the railroads and the increasing deterioration of their roadbeds have focused attention on the quality of the railroad infrastructure, the costs of its maintenance, and the potential cost savings that could accrue from abandonment of light-density lines.

Basically the problem is this. During the past decade the railroads have been increasingly pressed for revenues as high-value traffic has been diverted by truckload trucking operations. Since high-value traffic traditionally has had a high price-marginal cost ratio, the loss of this traffic has made it increasingly difficult to maintain adequate profit levels from

its remaining traffic. Since general rate increases on agricultural and related bulk traffic were neither politically viable (because of pressures to maintain the traditional rate structure), nor economically tenable (because of competitive pressures from water carriers or truckload operations),¹³ the railroads have tended to turn to deferred maintenance to maintain their ostensible profit levels.

Deferred maintenance is an attractive means of maintaining profits over a short-term business cycle since it takes several years for the roadbed to deteriorate sufficiently for its impact to become apparent. Thus as long as revenues can be expected to grow sufficiently in the future to provide the funds for the rehabilitation of the roadbed, deferred maintenance is a rational policy for railroads to follow.

If, however, the reduction in revenues arises from long-term secular forces having to do with the growth of competitive trucking operations rather than from short-term cyclical swings, problems are clearly created as the roadbeds continue to be cannibalized to meet the short-term financial obligations of the railroads. With the deterioration of the roadbed comes reduced speeds, increased derailments, and a deterioration of service. Thus a vicious cycle becomes established under which the service deterioration diverts traffic to trucks, which causes a reduction in rail revenues, which causes further deferred maintenance and a concomitant deterioration in service.

The state of the rail roadbed has currently reached crisis proportions,¹⁴ and a number of alternatives are being considered to solve this problem. Of these, the least drastic is probably giving subsidized government-guaranteed loans to the railroads to permit them to bring the roadbeds up to acceptable levels. Since this would correct a major imperfection in the capital markets facing the railroads, this proposal has considerable merit.¹⁵ Its major drawback, however, is that the infrastructure requirements and the revenue declines may be too large to make a politically viable loan program also effective.¹⁶ Thus, instead of a rather modest loan program, a major program of infrastructure finance may be required. Of course, whether Congress would accept such a program is highly problematical.¹⁷

In the absence of major infrastructure investments, attention has focused on the possible economies arising from abandonment of light-density lines. Keeler (1974) and Harris (1977b) have both argued that substantial economies can be obtained from permitting the railroads to divest themselves of lightly used lines and their associated maintenance and operating costs.

From a political viewpoint, this proposal has the decided liability that it is at ostensible odds with traditional policies to ensure cheap and adequate transportation to rural, agricultural shippers. If, however, truckload operations are really rail competitive, one can argue that these shippers should not suffer under hardship in the event of rail abandonment.

Common carrier trucking obligations Although trucking was largely brought under regulation as a means of preserving the value-of-service rate structure, current questions raised by trucking deregulation deal with the possibility of destructive competition and the adequacy of service to small shippers in light-density rural areas.

Currently, all regulated trucking firms have a common carrier obligation to serve all shippers regardless of their location or size. Since, however, LTL shipments, short hauls, small loads, and small shipments are more costly to transport than large-load, long-haul, truckload shipments, service to small shippers in light-density rural areas is inherently more expensive than service to large shippers in high-density urban areas. However, it is generally believed that the rate structure does not fully reflect these cost differentials.¹⁸ Hence the existence of a cross subsidy is widely perceived in which rates to light-density rural areas are held below their remunerative levels.¹⁹ Consequently, trucking regulation is often defended on the grounds that its elimination would lead either to substantial rate increases to small rural shippers, or to abandonment of service, or to both.²⁰

In addition, proponents of regulation argue that common carrier trucking is subject to substantial economies of scale, and point to the large number of trucking mergers that have taken place in recent years as supporting evidence. Thus, according to them, in the absence of regulation, large trucking firms would exploit their inherent cost advantages and undercut their smaller competitors. The eventual market structure would consequently be characterized by a few large carriers giving service on the high-density, low-cost routes, with a fringe of small carriers providing service to the low-density, high-cost routes. Thus, according to this scenario, deregulation would lead to substantial service reductions and increases in rates to small rural shippers, and a highly concentrated market structure (and presumed accompanying high rates) in the high-density urban areas. Consequently, everyone would lose with the exception of the large, efficient trucking firms.

While the present regulatory structure provides clear incentives to merge to acquire additional operating authorities, it is difficult to argue

that trucking is inherently subject to increasing returns to scale. While large firms may presently have lower costs, these costs are not lower because the firm is large per se, but because the firm is able to carry a broader range of commodities over a geographically dispersed area and thus utilize its fleet more efficiently. In the absence of regulatory restrictions on commodities and localities, however, there is little reason to believe that large firms would be inherently more efficient than small firms. Thus it is likely that any economies of scale that are currently observed are due to regulatory practices rather than to the technological structure of the trucking industry.²¹

Nevertheless, it does appear to be true that service to low-density rural shippers is inherently more costly to produce than service to large shippers in high-density urban areas. Thus to the extent that the current rate structure may not adequately reflect these cost differentials, small shippers in low-density rural areas could be expected to face increases in rates.

In view of the uncertainties concerning the structure of costs with respect to different types of services on the part of common carrier trucking and the implications of these cost differentials for the trucking rate structure, it is important to undertake a thorough analysis of the costs and technology of the LTL trucking market. Once these cost differentials have been fully analyzed and understood, the implications of marginal cost pricing or of monopolistic rate making can be explored to evaluate the impact of deregulation upon rural shippers. In addition, such an analysis of the costs of common carrier trucking should permit a better understanding of the question of the existence of economies of scale in the regulated trucking industry.

In conclusion, then, this book will focus on the issues of the value-of-service rate structure, railroad infrastructure and abandonment, and common carrier trucking obligations, and assess the allocational and distributional implications of a relaxation of regulatory restrictions in these areas. As an important by-product, this study should yield substantially improved cost functions and demand functions for the various modes over those that are currently available. Thus from the view of positive economic analysis, this study should improve our understanding of rail and trucking cost and demand functions. From the view of normative policy analysis, this study should yield quantitative measures of the allocational and distributional costs and benefits resulting from present policies or specific alternatives. Consequently, while hardly providing the definitive analysis of the subject, it is hoped that this book will provide

important insights that have previously been lacking in the area of regulatory analysis and will provide a firm analytical foundation upon which regulatory policy can be evaluated.

This book takes the following form. Chapter 2 discusses the costs and demand of rail and truckload trucking operations to provide a general overview of the structure of these industries. Chapters 3, 4, and 5, respectively, provide an analysis of the implications of relaxing restrictions concerning the value-of-service rate structure, the maintenance of the railroad infrastructure and service abandonment to light-density areas, and the maintenance of common carrier trucking obligations. Chapter 6 provides a brief summary and conclusions. A series of technical appendixes presents the econometric analysis of the costs of the relevant modes, the model of regional income determination, and the simulation analysis used to derive the competitive equilibrium.

Notes

1. Privately owned intercity carriage and agricultural commodities carried by truck are exempt from regulation. Thus while all rail shipments are subject to regulation, somewhat less than half of all trucking shipments and one-fourth of all inland waterway shipments are subject to regulation.
2. See, for example, Buck (1965), Kolko (1965), Benson (1955), Tarbell (1904), MacAvoy (1965), and Friedlaender (1969).
3. For example, the first annual report of the ICC stated, "The public interest is best served when the rates are so apportioned . . . by making value an important consideration and by placing upon the higher classes of freight some share of the burden that on a relatively equal apportionment . . . would fall upon those of less value." [ICC (1887, p. 36)].
4. For a good discussion of the Hoch-Smith Resolution see Nelson and Greiner (1965).
5. The formation of Amtrak and the takeover of rail passenger service on the part of the federal government can also be interpreted as an effort to maintain rail profitability and thus foreclose efforts to alter the value-of-service rate structure.
6. See, for example, Gellman (1971).
7. For an interesting analysis of this point see Moore (1976).
8. Of these, the most important are Keeler (1972, 1974), Harbeson (1969), Friedlaender (1969), Moore (1975), Boyer (1977), and Levin (1978).
9. See, for example, Douglas and Miller (1975), Eads (1972), Jordan (1970), and Keeler (1972).
10. The 4-R Act gave the railroads the freedom to raise or lower rates by 7 percent, subject to the constraint that "market dominance" not be present. The commission has interpreted the existence of "market dominance" in a narrow fashion, however, and generally prevented rate increases in the case where only one railroad serves a given area, even though trucks may offer substantial competitive alternatives.

11. For example, John Snow, Vice-President of the Chessie System, told reporters at the Transportation Roundtable in the National Press Club on October 13, 1978, that railroads are considering proposing total deregulation of the railroads over a five-year span. See *Traffic World* (October 23, 1978), 19 and 27.
12. The current state of the debate can probably be summarized in the ICC's analysis of the costs and benefits of regulation (ICC, 1976).
13. In fact, the railroads have tried to cope with this situation by general rate increases, which have generally exceeded those of the trucking industry.
14. For a good recent discussion of this problem see Federal Railway Association (1978).
15. Because the railroad infrastructure is nontransferable, financial institutions have traditionally been unwilling to give loans for infrastructure improvements. This has led to distortion of rail capital in that railroads have tended to invest fairly heavily in equipment, for which they can obtain funds because of its transferable nature, at the expense of infrastructure.
16. It is precisely the feeling that the railroads' problems are due to factors other than the deterioration of the roadbed that has apparently encouraged the railroads to pursue deregulation.
17. Of course, highways and waterways have traditionally been financed by the federal government while the railroad infrastructure has been privately financed. Thus there may be considerable justification in a policy that would impose some priority to federal expenditures on railroad infrastructure.
18. For an elaboration of these views, see Friedlaender (1978b) and Spady and Friedlaender (1978).
19. The extent of this cross subsidy is a source of considerable controversy. Many trucking executives claim that their firms actually make losses on these shipments. Since, however, measures of average costs are essentially arbitrary in a multiproduct firm, these claims should probably be greeted with some skepticism. As a more meaningful measure, one can consider whether revenues cover incremental costs, which measure the differential costs associated with providing a specific service. While not always easy to measure in practice, these can be measured in principle by estimating all of the cost savings that could accrue to a firm from abandoning a particular type of service. These cost savings reflect the incremental costs associated with the service, and a cross subsidy can be said to exist if its revenues fail to cover its incremental costs.
20. For an interesting view of the regulatory debate in trucking see National Research Council (1978).
21. For an elaboration of these views see Friedlaender (1978b), and Spady and Friedlaender (1978).

