



Common Carrier System in a Modern Economy: Research Problems

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The common carrier system of the United States has been based on factors and information of the 1930s and 1940s when the Federal Coordinator, the Transportation Act of 1940, and the Board of Investigation and Research were prominent. Although provisional, the resources and enactments of this era have been used for 3 decades as the basis for policy and administration. Therefore, a new intellectual movement is necessary to realize the full potentials of the common carrier concept, formulate the design of a regulatory or policy system, and develop the demand and supply capabilities of a modern transportation system. Research hypotheses should be derived from a basic economic appraisal of demand and supply under current conditions. From such should follow legal research on the nature of obligation necessary to realize an extended common carrier system and the elements of a logistical system needed to redefine transportation demand or product lines, and to provide the bases for improved performance in the supply systems consistent with a modernization of the common carrier concept and the modern product line concepts consistent with logistical science. Such research should be institutionalized through the legislated creation of an official study organization so that both objective and authoritative attention can be given to leading transportation issues.

A study of the common carrier problem takes in 2 interrelated subjects: (a) growth potentials of the concept itself consistent with modern economic trends and (b) a study of demand and supply conditions for transportation service as a basis for carrier development. Consistent study of these two aspects of the common carrier problem will of necessity create an intellectual movement, a research agenda, that goes beyond the scope of current research programs. From such an intellectual movement will flow a family of studies in policy, transport markets and logistics, management, information, costing, and technology forecasting. This intellectual program should be more sharply focused and better organized than the elements of intellectual tradition out of which the current common carrier problem emerged. An official organization should be created through legislation to perform objective and authoritative studies.

This paper will first review the evolution of the intellectual tradition in the study of common carrier problems and then will give some remarks and conclusions on general economic factors, the common carrier concept, and demand and supply factors affecting common carrier service. It will conclude with an examination of organizational alternatives for continuing studies.

INTELLECTUAL TRADITION

Consideration of the common carrier problem today is in the shadow of the research legacy of the 1930s. That was the era of the Federal Coordinator of Transportation, the enactment of the Transportation Act of 1940, and the Board of Investigation and Research, which grew out of that legislation (1). The intellectual resources were inadequate for the problem that faced even that era. This inadequacy was recognized by contemporaries, and their work by their own admission was considered provisional and experimental. For example, the coordinator's office was established as a temporary expedient with operating authority for only 3 years and in fact went out of business after 4 years. The Board of Investigation and Research was established to finish the work of the congressional groups that considered and enacted the Transportation Act of 1940, which itself was considered to be a provisional piece of legislation (2, 3). The provisional language of the Transportation Act of 1940 has become, however, an engraved fixture of the regulatory scene. Although Congress sought to find the economic bases of relative fitness and inherent advantages of competitive modes of transportation, its statutory language, cast in emergent or provisional form, has been interpreted for more than 30 years as definitive expression of intent. National transportation policy, the merger statutes, and the rule of rate making have had long administrative histories far transcending the limited experience of the legislature that enacted them to meet emergency conditions.

More significant, Congress established a research agency to assist in the evolution of transportation policy, but two generations later the research agency has been abolished and regulatory history has gone on. Regulatory activity has relied instead on the meager resources that

survived the era. At first, it survived by using the actual data developed by the coordinator and the board. But, when these became too far out of date, regulatory activity had to limp along on continuing surveys that survived, such as the 1 percent freight waybill study, or the various cost studies such as the burden study, which extend from the limited data of freight flow. [The 1 percent waybill study is now performed by the U.S. Department of Transportation (DOT) under a delegation from the Interstate Commerce Commission (ICC). In January 1973, DOT prepared for 1969 a duplicate of the ICC "burden study" entitled "An Estimation of the Distribution of the Rail Revenue Contribution by Commodity Groups and Type of Rail Car, 1969."] Instead of a living tradition of economic research, regulation in the postwar era has been based on the sacred relics of works intended to be a provisional response to a crisis.

The modern era then has seen the common carrier isolated from the intellectual growth of its age, frustrated in not even realizing the intent of the framers of the Transportation Act of 1940 for a vital flow of economic knowledge into the policymaking process.

ECONOMIC FRAMEWORK

Regulatory policy has been a subject of national dispute since 1950 but has been argued with the outmoded intellectual resources of the 1930s. A particular need to aid in the discussion of the regulatory issue is the formulation of a general economic framework. Such a framework is needed as a guide to the scope of regulation, to the design of a regulatory system more consistent with modern conditions, and to the evaluation of the impacts of regulation on the economic system, something not attempted before.

Regulatory design is conditioned by the structures of markets and supply systems or industries being regulated. An elemental factor in structure is the degree of concentration among the firms on both the demand and the supply sides. The traditional regulatory situation is a case in which a concentrated supplier can abuse an unorganized and diffuse market. A concentrated buyer would have a similar power over a diffuse group of suppliers. Transportation regulation since 1920 has been concerned with both sides of the economic equation—the welfare of the buyers of transportation and the welfare of the carriers, who are the suppliers. Economic research has as yet reached no satisfactory conclusion concerning the structure of either the market or its supplier.

Observation of the emergence of competitive modes of transport over the past 50 years had led to speculation that the market may have taken on some of the structural characteristics of free competition; that is, with buyers and sellers so diffuse, the actions of any one of them would have no effect on price or service. It is not clear that such a situation has emerged. In fact, some limited evidence suggests that the buyers of freight transportation are highly concentrated; possibly the top 500 volume shippers control 80 percent of all freight traffic. If both sides of the economic equation—supply and demand—are relatively concentrated, then a close examination of existing regulatory policies and possibly new designs for regulatory actions based on detailed studies of the structure of demand and supply industries would clearly be called for. These speculations should lead to a number of precise research hypotheses followed by suitable studies to form the basis of the design of regulatory policies.

Benefits, which accrue to consumers and buyers, are balanced by costs, which are incurred by producers and sellers of transportation services. The economic results of potential regulatory situations can be laid out in

clockwise fashion as shown in Figure 1. The following tabulation gives examples of four regulatory situations and the types of benefits and costs (from Figure 1) that correspond to them:

Situation	Benefits	Costs
Pollution regulation	Diffuse	Concentrated
Positive free enterprise	Diffuse	Diffuse
Safety regulation	Concentrated	Diffuse
Carrier oligopoly supplying concentrated market	Concentrated	Concentrated

The task of research is to locate transportation in this range of rational alternatives and then to prescribe policies for what research may find.

Policy prescription of the kind indicated may be conducted according to two alternative possibilities. If a degree of concentration is determined (or assumed) to exist among suppliers or buyers of transportation or both, a regulatory pattern based on incremental change in the current system might be indicated. Some of the dimensions of such changes are shown in Figure 2 for both demand and supply sides. On the other hand, if a greater degree of diffusion in both supply and demand is determined (or assumed) or desired, a different policy process emerges that is similar to what is commonly called deregulation. The actual design of a policymaking process will depend in this case on what research discloses. If economic trends are to bring both transport supply and demand closer to the competitive ideal, then deregulation is a logical possibility. If such a trend is not apparent but desired, then positive policies of breaking down existing concentrations are in order. The feasibility of such policies (e.g., breaking up the economic organization of the 500 leading industrial firms that ship goods for the sake of competitive transportation) is

Figure 1. Economic results of potential regulatory problems.

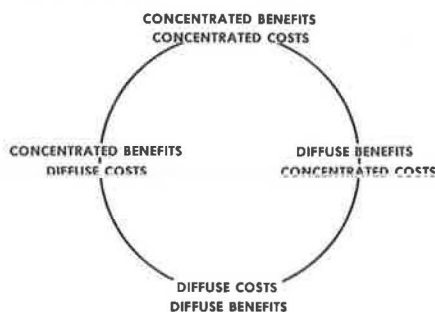


Figure 2. Rate-market relations in transportation.

Shippers Passenger Oligopsony Classmarket Below Cost Rates Above Cost Rates Service Disability Service-Cost Hiatus Absence of Market Information	Problems Carrier Oligopoly Discrimination Financial Instability Service Competition Absence of Cost-Revenue Information
Solution I, Existing Market	
Market Information Rational Programming and Supervision Market Performance Criteria	Cost-Revenue Information Rational Programming and Supervision Financial Performance Criteria
Solution II, Changed Market	
Competitive Industry Broadened Market	Competitive Regime

something that research should demonstrate.

Economic evaluation of the processes of regulation should be aided by modern advances in economic analysis. Two such processes should be mentioned: the modern study of industrial organization and administration and the methods of macroeconomic analysis, chiefly the input-output matrices. A principal contribution of recent economic research is an empirical evaluation of the deductive precepts of classical oligopoly theory (4, 5). From such evaluation, new theoretical concepts have emerged that relate to resource allocation, profits, innovation, and macroeconomic impacts (e.g., inflationary impacts of industrial concentration). The "new learning" in industrial organization has not yet been applied to transportation. To do so requires sustained research effort to define and assess measures of industrial performance.

Great progress has been made in the use of input-output tables in assessing the impacts of transportation policies although no regulation has yet resulted. (The DOT, through Jack Faucett Associates, has developed a method for developing full input-output detail for eight transport modes for all the basic input-output tables including 1947, 1958, 1963, and later series. This detail has been used in the projection of transportation requirements for national transportation planning. In addition, an extensive project under the university research program at Harvard University is developing a multi-regional input-output study of U.S. commodity freight shipments.) DOT has accomplished a modal breakdown of the interrelationships of transport and other economic sectors, and assessments of labor interruptions have been made for railroads, trucking, and longshore operations. Input-output analysis has also been applied to interregional transport flows, relating them to interregional economic relations. A project under way at the Massachusetts Institute of Technology will assess the economic impact of regulatory change (Scenarios for Alternative Roles of the Federal Government in Transportation, Proposal of the Massachusetts Institute of Technology under the Supplemental Solicitation for Major Interdisciplinary Research Programs, FY 1975 Program of University Research, April 1975).

Something also should be said about productivity analysis when some progress has been made (6). Productivity change trends (in terms of labor, capital, and total factors) have been traced for all modes of transportation. The theoretical problem of accounting for productivity change in transportation has not been solved despite some speculation to the contrary. Little effort is being made to explore productivity change in more pragmatic terms through studies of particular processes and technology assessments. A good example would be a study of terminal operation through conventional engineering and time and motion study. [Some limited efforts may have been made from 1969 to 1974 by the National Commission on Productivity. Unfortunately, the final report of the task force on railroad productivity (November 1973) contained no such analyses.]

The following research agenda summarizes the discussion of the economic framework:

1. Studies of market structure and performance;
2. Studies of industrial organization and performance in transportation;
3. Formulation of market-industrial organizational example cases as a basis for regulatory policy design;
4. Input-output analysis of alternative regulatory example cases in relation to the economy of the United States;
5. Theoretical and empirical studies accounting for productivity change in transportation;

6. Empirical study of productivity change in a variety of transportation areas, notably terminals, scale of operations, management, and technology assessment; and

7. Review of information programs and specification for economic studies in transportation.

POTENTIALS OF COMMON CARRIER CONCEPT

The common carrier concept has received little research attention. It is a rational, legal concept that is similar in scope to other institutional problems such as eminent domain or civil rights. But there has been no tradition of legal research in the common carrier field. Hence the common carrier concept is often misunderstood; some economists may consider it a mere rationalization for limiting competition, an excuse for internal subsidization, or an archaic, outmoded institution. And yet it is a form of basic legal obligation analogous to many other institutions in economic life. Its background, implications, and potential for growth should be explored in the best tradition of legal research.

Common carriage as we know it is a survival of a doctrine in English common law that prescribed public obligations on a great variety of professions and business activities serving the general public (7, 8). Known as the common callings doctrine, it imposed through common law courts the fixing of reasonable fees, obligation to serve all within the limits of facilities or capacity, and prohibition of unreasonable discrimination in charges or terms of service. In the evolution of the law, the common callings doctrine in modern times appears to have receded for many professions but was strengthened and took on specific structural characteristics for transportation. Common law obligations for transportation were made more explicit and reinforced by a variety of statutory and regulatory provisions. One of the forces giving structure to the common law definitions of common carriers was the process of regulation and the concomitant doctrine of natural monopoly, which was not a part of the original common law doctrine but was fashioned apparently to cope with the power of railroad enterprises and to furnish a rationalization for regulation in an era of laissez-faire economics. With the passing of natural monopoly in transportation and other enterprises, regulation more recently has begun to be extended to a variety of businesses in a way reminiscent of the original purposes of the common callings doctrines. In *Nebbia v. N.Y.*, 291 U.S. 502 (Sup. Ct. 1933), the natural monopoly theory was discarded and a doctrine of businesses "affected with a public interest" was adopted. The legislative branch was given the right to define such public interest in any reasonable manner as a result of the court's decision.

Common carriage today has a highly structured format; it has been restricted to a particular kind of service and excludes contractual transportation services or services involved with the management of the distribution function. Common carriage is defined by legislation and regulation on the basis of individual shipments, each of which has its peculiar documentation. In fact, common carriage is defined as conformity to a documentary standard in terms of service obligation. The historic obligations of reasonable rates, obligation to serve, and prevention of discrimination and the public nature of operations remain, but in a highly restrictive context. In the motor carrier field, there is an abundant body of law that differentiates common carriage from contract service. Generally the definition of contract service has tended to be made more restrictive and limited to one or a few shippers for each contract. Contract carriers

have also been restricted on the number of shippers they can serve. Dual operations and combinations of private and contract services have been severely restricted.

Restriction on common carriage also applies to the definition of transportation service. Transportation-related activities such as warehousing, financing of goods in transit, and other services connected with the physical distribution process tend to be restricted by the fiat of the regulatory process. Far from capitalizing on their potential service capabilities, common carriers today offer truncated services, filling orders of a very specific kind on the direct specification of the shipper. Even the process of payment is specified; time of payment is limited by statute or regulation to a short period, making transportation unique among businesses by the cash-and-carry relationship it maintains with its business customers. None of these restrictions comes within the purview of the historic common carrier obligation, which is stated in functional terms that define rights and obligations, not specific processes and institutions. The obligation of reasonable service without discrimination to the limits of capacity is the basic element of the common carrier doctrine. The same doctrine could apply to so-called contract service, to the extension of credit for the distribution function, and to performance of some aspects of distribution management.

Without the ability to specialize in the total distribution function, transportation management has atrophied because of the absence of any challenge for service expansion or any participation in a vital, growing industrial process. The cure for this atrophy is a widening of the common carrier doctrine to take in what is now known as contract carriage, to include many functions now listed under the definition of distribution management, and to relate transportation service to this wider context. The historic common callings doctrine has room for all these items within the purview of an industry affected with a public interest.

The research agenda in the common carrier field should include

1. A fundamental study of legal obligation as it applies to transportation and as it relates to other commercial law such as common law prohibitions of restricted competition;
2. A study of distribution management from the point of view of extended concepts of common carrier obligation; and
3. Empirical studies of contract carriage, private carriage, and exempt transportation from the point of view of obligation.

DEFINING TRANSPORTATION SERVICE FROM DEMAND POINT OF VIEW

Transportation, particularly freight transportation, requires a redefinition of the service that is sold. In other words, the product line of a common carrier is insufficiently specified for clarity in managing either (a) logistics for a shipping or receiving business or (b) a carrier enterprise itself in the modern sense. Public policies cannot be evolved properly for a public interest transportation system until a better concept of such a product line becomes operational. Because of the lack of such an operational concept, the services of the carrier to the shipper are inadequate, and too much burden may be placed on the shipper in managing his or her transportation needs.

Such a redefinition of service is essential to the expansion of the common carrier concept. Today, as

noted previously, the common carrier concept is essentially a study in nominalism expressed by documentary standards in place of real service concepts.

It appears that the literature on distribution management, or logistics management, reflects the most advanced state of the art in terms of specifying the demand dimensions of transportation service in modern terms. The classic statements of distribution management appear to be by Heskett, Ivie, and Glaskowski (9) and Smykay, Bowersox, and Mossman (10). In this literature, distribution policies are stated in terms of deliveries, inventories, and the workings of a consistent system over time. The role of transportation in this system in practice may differ from the ideal expressed in the literature. Distribution policies appear to be developed unilaterally by shippers, and transportation requirements are specified in detail by buyers. The role of transportation is to supply the specified services in accordance with the prevailing documentary standards. When these standards prove inadequate or inconvenient, the buyer has increasingly come to assume the transportation function himself or herself. In some industries with particularly sophisticated transportation requirements, such as the petroleum industry, the buyer has assumed practically all the transportation management functions on a multimodal basis.

A lag probably also exists between the ideals of the literature of logistics management and the actual practices of shippers, which may be piecemeal or traditional. The inefficiencies of these practices may be covered in the overall marketing costs of the products, particularly in those industries with high concentration of ownership (oligopolies). There accordingly appears to be need for additional research in specifying the dimensions of a transportation service according to logistical principles. Such research might have 3 phases.

1. The concept of a transportation product line according to logistical science would be refined. The "stock-out policy" concept being developed at MIT seems to be the most advanced notion in the field today (11).
2. Existing shipping practices to map an approach to operationalize a product line concept should be studied under varying conditions. Included in such a study would be an overall management concept.
3. The demand features of such product line policies, including practical means of trade-off analysis among the various components of a logistical system, and the problem of cross-elasticity of demand among modes of transportation should be studied.

SUPPLY CAPABILITIES OF TRANSPORT SYSTEMS

Achievement of a modern specification of a transportation product line depends not merely on further research into the demand or logistical systems dimensions but more particularly on the supply capabilities of transportation systems to provide such product lines. Transportation today is supply oriented rather than demand oriented and may well reflect the futility of Say's classic statement that supply creates demand. Adjustment of the supply system to a demand-oriented product line may be the most difficult of all problems in the modern transportation economy. Information systems, modal organization, industrial and operational practices, in short, the entire transportation system, is organized on a theory totally inconsistent with modern logistical needs. The task of research is therefore to conceptualize consistent supply systems, specify their organizational and operational dimensions, and study the performance economies to be expected. A part of such a research

program would be the organizing of a phasing operation so that the system could modernize incrementally with much of the current imperfect infrastructure.

Research issues with respect to supply capabilities are less a product of initial conceptual difficulty than they are a product of the complexity of the phenomena involved and the number of changes of various kinds that will be necessary. Some shortcuts are needed to get some useful work under way and bypass the incredible complexity of the transportation supply apparatus. Some of the network analysis being done at MIT for the northeast railroads will have a bearing on this problem (12). Such analysis can provide a basis of testing, under varying assumptions, the efficiency of parts of complex systems. The work done in DOT with respect to the use of sources and application of funds as a device for assessing common carrier revenue needs can provide a set of macrocriteria for cost and investment (13, 14, 15). Some of the work done with respect to transportation productivity may point the way to the measurement of performance. There is still need for analytical approaches for focusing research on useful changes for upgrading system performance.

Solution of the research problem in the supply area, to be manageable, might be focused incrementally on two areas of interest: (a) refinements and redefinitions of performance indicators and (b) assessment of system components in terms of performance and productivity as contributors to improved system performance. Rather than undertake at the outset massive systems studies, one might better deal with small cases to test procedures and establish analytical and operational foundations for supply system improvements.

Operation of the current transportation system would appear to offer abundant opportunities for such limited case analyses (e.g., the handling of the wheat exports to the Soviet Union by the railroads and the ports). What would an after-the-fact analysis of this performance reveal about performance expectations and definitions, the performance of terminal and line-haul functions, and the related rate incentives associated with this large surge movement? Another example might be the marketing of a particularly valuable but perishable seasonal commodity (16, 17). The study of the performance of carriers in marketing the cherry crop of eastern Washington State might be a good example of such a case study. The Washington State University agricultural economics group traced both rail and truck shipments all over the country and measured performance in terms of delivery times. Comparisons were made between closely measured delivery times and delivery performance as perceived by shippers. This comparison revealed the opportunity for creating new and more scientific concepts of performance management and description on the part of carriers and shippers. Such a study could also be extended to selected system components that would be useful in expediting the kind of shipment under study (e.g., economies and performance of refrigeration facilities, terminal switching, interchange, and relationships between costs and rates).

The aim of such supply studies would be to develop a transportation supply system capable of advanced logistical performance and to realize in practice a new concept of product line for common carriers by using such logistical concepts.

In summary, then, realization of improved supply performance might require these kinds of research:

1. Experimentation and perfection of systemwide analytical methodologies;
2. Study of improved financial and administrative tools for planning and managing supply systems that

would build on the principle of sources and application of funds;

3. Improved information and costing systems consistent with planning and management tools, including better productivity studies;

4. Incremental studies of performance measurement and definition; and

5. Incremental studies of system component performance.

ALTERNATIVES FOR OFFICIAL RESEARCH ORGANIZATION

Interest in the results of research on the common carrier system is both large and conflicting. A highly focused effort, therefore, must be conducted by an objective organization not advocating a particular doctrinal solution. Moreover, the size and scope of the interests involved make it desirable that official recognition be given to the institution designated to perform the research tasks. Therefore, a conclusion of this paper is that legislation be enacted to establish an official transportation research organization to perform policy-oriented research on common carrier issues.

Precedents for such an organization exist in the legislation establishing the Federal Coordinator of Transportation (Emergency Transportation Act of 1933) and the Board of Investigation and Research (Transportation Act of 1940). A combination of objectivity and authoritative scope was desired in these two efforts. We now have 30 years of experience without such organizations, and we have not improved on the intellectual tradition that they established.

Students of transportation are well aware of the scope of conflict relating to common carrier policies, but the general nature of such conflicts in both private and public sectors should be indicated to demonstrate its dimensions.

In the private sector, we could identify the following areas of conflict:

1. Shipper and receiver versus carrier,
2. Producing versus consuming interest for social groups,
3. Producing versus consuming interest for regions,
4. Regional producing groups,
5. Common versus private carriage, and
6. Competition among regulated and unregulated common carrier modes.

In the public sector the following areas of conflict appear:

1. Federal versus state and local political interests,
2. Executive versus legislative interest,
3. Substantive versus legal interest centering in the federal courts,
4. Regulatory agency versus executive departments,
5. Conflict of interest among regulatory agencies, and
6. Conflict of interest among federal executive agencies.

Transportation is characterized both by wide areas of conflict and extensive experience with institutions for conflict resolution. The existence of an objective and authoritative research institution to bring policy analysis into legislative and other political processes could assist in the continuing process of conflict resolution. Some experience in this area is being gained in the efforts of individual states to regulate environmental matters through separate research organizations to serve objectively and authoritatively both adjudicatory

and executive policy agencies (18).

Three models for such a research agency should be considered.

1. An independent agency could be established modeled after the Board of Investigation and Research. Such an agency could channel the resources of numerous governmental research organizations, solicit private and university cooperation, and have subpoena powers to compel data on vital issues.

2. An agency could be established within the framework of the executive branch. This agency might be managed by the U.S. Department of Transportation but would exist somewhat independently of its hierarchical structure.

3. A unique agency could be established by authority of Congress that would be owned and operated by carrier interests but would not be accountable to them. Supervision of such an agency would be a problem but might take the form of a public board combining private and official interests, supervision by an academic institution or the National Academy of Sciences, or supervision by a federal judge.

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