

AN ANALYSIS OF THE MARITIME
INDUSTRY AND THE EFFECTS OF THE
1984 SHIPPING ACT



REPORT OF THE
FEDERAL TRADE COMMISSION

NOVEMBER 1989

ACKNOWLEDGMENTS

This report was prepared by the Bureau of Economics under the supervision of John L. Peterman, Director and Paul A. Pautler, Deputy Director. Bureau of Economics Deputy Assistant Director Timothy P. Daniel supervised the drafting of the report by staff economist James D. Reitzes. Staff economist Alan D. Mathios prepared the statistical analysis contained in Appendix A. Bureau of Economics Deputy Assistant Director Michael G. Vita and Bureau of Competition Assistant Director John E. Lopatka provided valuable editorial assistance.

**Comments by the Federal Trade Commission on the Maritime
Industry in Response to its Obligation Under
Section 18 of the Shipping Act of 1984**

Table of Contents

I.	Introduction	2
II.	Industry Background	3
III.	Legislative Background	8
IV.	The Rationales for Regulation	14
V.	An Evaluation of the Three Rationales for Regulation	17
VI.	The Potential Costs of Regulation	21
VII.	Effects of the 1984 Shipping Act	28
	A. Service Contracts and Independent Action	28
	B. Statistical Analysis	35
	1. The Impact of 1984 Act on the Structure of Rates	36
	2. The Impact of the 1984 Act on Rate Levels	37
VIII.	Common Tariffs For Products of Equivalent Volume and Mass	39
IX.	Tariff Filing Requirements	44
X.	Antitrust Immunity for Ports and Marine Terminals	48
	A. The Basic Rationale for the Antitrust Laws	51
	B. The Rationales For Antitrust Immunity Are Unconvincing	52
XI.	Conclusion	62
	Appendix A	64
	Bibliography	77

I. Introduction

Section 18 of the Shipping Act of 1984 ("1984 Act") requires that the Federal Maritime Commission (FMC) collect and analyze information concerning the 1984 Act's effects on the ocean shipping industry over the five year period after the Act's passage. Within six months of the expiration of this five-year period, the Act requires the FMC to submit a report of its findings to Congress, the Advisory Commission on Conferences in Ocean Shipping, the Department of Transportation, the Department of Justice, and the Federal Trade Commission. The FMC Report was issued on September 20, 1989.¹

Section 18 also requires the Federal Trade Commission and the aforementioned departments to furnish their own analyses of the 1984 Act to Congress and to the Advisory Commission on Conferences in Ocean Shipping within sixty days of the release of the FMC Report. In addition to addressing the overall effects of the 1984 Act, these analyses must specifically discuss the following three areas:

- (1) the advisability of adopting a system of tariffs based on volume and mass of shipment;
- 2) the continuing need for the statutory requirement that tariffs, both conference and non-conference, be filed and enforced by the FMC; and
- (3) the need for antitrust immunity for ports and marine terminals.

¹ Federal Maritime Commission, Section 18 Report on the Shipping Act of 1984 (September 1989). (hereafter "FMC Report")

In fulfillment of this statutory obligation, the FTC submits the following comments. They are organized as follows. Sections II and III provide a brief background of the ocean shipping industry and its regulatory history. Section IV describes the rationales advanced in the FMC Report for regulating the industry. These rationales are evaluated briefly in Section V. Section VI addresses the potential costs associated with permitting firms in an industry, including the ocean shipping industry, to form a cartel, which to some extent describes how ocean shipping conferences have operated historically. Section VII analyzes the effects of the 1984 Act, paying particular attention to: (1) the roles of service contracts and independent action; (2) the structure of shipping rates; and (3) the levels of shipping rates. Sections VIII, IX, and X discuss the three areas cited above on which Congress specifically requested comment. Section XI provides concluding comments.

II. Industry Background

Since the late 1800's, ocean common carriers have typically operated within the framework of a conference system.² Conferences constitute cooperative agreements among two or more carriers serving a given market. Conferences can, and historically have, set freight rates, and they have also restricted other forms of competition, for example, by regulating the sailing schedules of conference participants.

² Ocean cargo carriers can be divided into three groups: private, tramp, and common. Private carriers are owned and operated by the firm shipping the cargo; some oil tankers are an example. Tramp carriers are hired by the job, i.e., they do not have a specified schedule. Common carriers provide fixed service, at regular intervals, between named ports and are available for hire by anyone. The conference system, and its regulation by the FMC, pertains only to common carriers.

The conference system, almost from its inception, led to arrangements among conference members that covered a variety of practices other than ratesetting and scheduling. For example, some conferences provided deferred rebates to shippers that used conference carriers exclusively. The aim of this practice, whether successful or not, was to create disincentives for shippers to use carriers that were not conference members. Such disincentives would arise because a shipper would forfeit its right to receive a deferred rebate from the conference if it elected to use a nonconference carrier. Another practice involved the use of conference "fighting ships" to compete with independent (nonconference) carriers by offering lower rates and sailing at virtually identical times. The losses from the operation of these ships were spread over all conference members. These practices led to two investigations, one in 1909 by the British Royal Commission on Shipping Rings and another in 1914 in the U.S. by the House Committee on Merchant Marine and Fisheries (chaired by J.W. Alexander). The Alexander Report led to the passage of the Shipping Act of 1916, which established the regulatory structure that survives in large measure to this day.³

Many ocean common carriers offer service between several countries, and it is not uncommon for a carrier to be a member of more than one conference. Between twenty and fifty carriers serve several key U.S. routes.⁴

³ Section III, *infra*, discusses the regulatory structure in some detail. The United Nations has also sanctioned international carrier conferences through the U.N. Liner Code, formally known as the Convention on a Code of Conduct for Liner Conferences, adopted by the United Nations Conference of Plenipotentiaries on April 6, 1974. The United States is not a signatory because it opposes the U.N. agreement's endorsement of closed conferences and requirement that signatories reserve a portion of their international trade for their own fleets. FMC Report, p. 28.

⁴ FMC Report, pp. 53-54.

Not all carriers join conferences. Some remain independent and compete directly with conference members. The share of the market controlled by independent carriers varies widely depending on the routes involved. The following table provides the 1988 total market share of independent carriers operating along each of various routes, based on the value and tonnage of commodities transported:⁵

1988 Total Market Shares of Independent Carriers: Various Routes

<u>Route</u>	<u>1988 Value Share</u>	<u>1988 Tonnage Share</u>
U.S.--Far East North Pacific (outbound)	27%	36%
U.S.--Far East North Pacific (inbound)	40	46
U.S.--Far East South Pacific (outbound)	16	27
U.S.--Far East South Pacific (inbound)	22	47
U.S.--Northern Europe (outbound)	22	40
U.S.--Northern Europe (inbound)	23	36
U.S.--Italy and Mediterranean (outbound)	27	25
U.S.--Italy and Mediterranean (inbound)	23	23
U.S.--Australia (outbound)	30	44
U.S.--Australia (inbound)	51	47
U.S.--Brazil (outbound)	7	3
U.S.--Brazil (inbound)	5	7

The table shows that, in 1988, independent carriers controlled between 15 and 30 percent of the value of cargo traffic with four exceptions: the inbound Far East North Pacific Trade, the inbound Australia Trade, and the inbound and outbound Brazil Trade.⁶ The tonnage share figures are for the

⁵ FMC Report, pp. 310, 314, 315, 319, 323, and 326.

⁶ The United States-Brazil trade, unlike any of the others, is subject to a revenue pooling/cargo reservation agreement, under which 40 percent of the inbound trade must be carried by U.S.-flag carriers and 40 percent by Brazil-flag carriers. That leaves only 20 percent available to third-flag carriers. For outbound traffic, the United States and Brazil have negotiated a bilateral cargo-reserving agreement which ensures that each country's carriers receives an adequate share of the market. See FMC Report, pp. 61, 94-95.

most part higher than the value share figures. This indicates that independent carriers typically transport lower-valued goods than conference carriers. In recent years, however, independent carriers appear to be increasing the proportion of higher-valued cargo in their cargo mix.⁷

On most routes serving the United States, the principal method of transporting goods via ocean carrier involves the use of containerships, which are designed to handle 20-foot or 40-foot containers that can be unloaded by crane from a truck and placed directly on the ship. This system of handling cargo, introduced in 1957, has largely replaced the prior "breakbulk" system, where cargo was loaded in small lots.⁸ Further, the FMC reports that carriers have increasingly been employing larger vessels. The use of larger vessels, however, has contributed to excess capacity in certain trades.⁹

The magnitude of shipping involving the U.S. trades has grown during the 1980's. Between 1980 and 1988, the tonnage shipped by ocean common carrier has increased by roughly four percent per year, while the value of commodities shipped by ocean common carrier has increased by roughly eight percent per year.¹⁰ Industry capacity has grown more rapidly. The following table presents data on the annual growth rate of container capacity provided between 1984 and 1988 for various routes in total and broken down by conference members and independents. These figures

⁷ FMC Report, p. 21.

⁸ Containerization is less prevalent on routes that lack modern port loading and handling facilities. Chief among these trades is US-Brazil.

⁹ FMC Report, pp. 53 and 247.

¹⁰ These percentages were calculated using figures in the FMC Report, p. 77.

indicate that the growth in capacity has outstripped the growth in tonnage and the value of shipments.¹¹

**Annual Percentage Rate of Growth in Container Capacity Provided, 1984-88
Total, Conference, and Independent Growth Rates
(Various Routes)**

<u>Route</u>	<u>Total</u>	<u>Conf.</u>	<u>Ind.</u>
U.S.--Far East North Pacific (outbound)	14%	22%	4%
U.S.--Far East North Pacific (inbound)	13	12	15
U.S.--Far East South Pacific (outbound)	41	37	49
U.S.--Far East South Pacific (inbound)	34	23	56
U.S.--Northern Europe (outbound)	14	5	40
U.S.--Northern Europe (inbound)	14	2	46
U.S.--Italy and Mediterranean (outbound)	16	24	7
U.S.--Italy and Mediterranean (inbound)	10	9	14

The table indicates that, on most routes, independents have increased their capacity more rapidly than conference members during the 1984-88 period. In spite of this, independents typically have not significantly increased their market share of commodity shipments on the various routes. For example, independents increased their market share (in value) by only four percent on the Northern Europe trade during the same period. In the Far East South Pacific Trade, the independents' market share (in value) fell by almost twenty percent.¹²

¹¹ FMC Report, pp. 271, 278, 279, 284, 285, 291, 292 296, and 302. Capacity is measured in TEU's (twenty foot container equivalent units), except in the Brazil trade. In the Brazil trade, many ships are still not containerized, so deadweight tons was used to express capacity. Note that we are comparing the growth in total shipments, which contains both containerized and noncontainerized cargo, and the growth in container capacity provided. Given that most trade uses containers, we believe that the comparison, while not exact, is relevant.

¹² FMC Report, pp. 329-30.

III. Legislative Background

The Shipping Act of 1916 gave the United States Shipping Board (now the FMC) the authority to grant antitrust immunity to conference agreements. At the same time, the 1916 Act also placed certain restrictions on the industry to prevent the occurrence of what were believed to be trade abuses.¹³ The 1961 Amendments to the 1916 Act required ocean common carriers to file tariffs with the FMC and stipulated that rates so filed could not be increased with less than 30 days' notice.

Conferences involving U.S. trades must be open, meaning that they cannot restrict membership. All conference agreements involving U.S. trades are subject to FMC review and ultimate approval. Most agreements cover the establishment of freight rates and frequency of service. The agreements that do not are concerned with revenue sharing, service rationing, and space rationing.¹⁴ Conference agreements typically cover shipments in one direction (such as eastbound), although the conference in the opposite direction typically consists of many of the same members.¹⁵

The Shipping Act of 1984 replaced portions of the Shipping Act of 1916, the 1961 Amendments to the 1916 Act, and certain other maritime laws that were passed in the intervening period. One purpose of the 1984 Act was to clarify which agreements among ocean carriers would be exempt from the antitrust laws. Confusion regarding the scope of permissible carrier

¹³ For example, the 1916 Act prohibited conferences from providing selected shippers "deferred rebates" and from using "fighting ships".

¹⁴ For instance, in the 1981-83 period, 310 of the 441 agreements (excluding marine terminal agreements) filed were to establish conference rate-making authority. Only 63 involved joint service, space chartering, revenue pooling, or service or space rationing. FMC Report, pp. 379-381.

¹⁵ FMC Report, p. 23.

agreements followed a 1968 Supreme Court decision involving Aktiebolaget Svenska Amerika Linien ("Svenska"). In its Svenska decision, the Court stated that rate-making and cargo-rationing agreements among carriers could not be approved by the FMC unless such agreements were "required by a serious transportation need, necessary to secure important public benefits or in furtherance of a valid regulatory purpose of the Shipping Act."¹⁶ According to the FMC Report, "carriers and conferences complained that the Svenska standard was too vague and placed an undue burden on them."¹⁷

In an effort to remove the confusion, Section 4 of the 1984 Act lists the types of agreements covered by the Act, and Section 7(a) grants an antitrust exemption to them.¹⁸ Agreements covered by the 1984 Act, and which therefore are covered by the antitrust exemption, include those which:

- (1) discuss, fix, or regulate transportation rates, including through rates, cargo space accommodations, and other conditions of service;
- (2) pool or apportion traffic, revenues, earnings, or losses;
- (3) allot ports or restrict or otherwise regulate the number and

¹⁶ Federal Maritime Commission v. Aktiebolaget Svenska Amerika Linien, 390 U.S. 238, 243 (1968). The "Svenska standard" was based on the Court's reading of the 1961 amendment to the 1916 Act that disallowed conference agreements found to be "contrary to the public interest." Of particular concern to carriers was that the Svenska standard could be interpreted to permit the FMC to subject conference agreements to analysis comparable to that applied under the antitrust laws.

¹⁷ FMC Report, p. 36.

¹⁸ Public Law 98-237, cited as the "Shipping Act of 1984," section 4(a). The 1984 Act also added to the antitrust immunity available under the 1916 law for carrier activity pursuant to an approved agreement. Section 7(a)(2) of the 1984 Act exempts from the antitrust laws activities of carriers reasonably believed by them to be in conformity with an approved agreement. The government can only challenge these activities as violations of the Shipping Act of 1984, not as violations of the antitrust laws.

- character of sailings between ports;
- (4) limit or regulate the volume or character of cargo or passenger traffic to be carried;
 - (5) engage in exclusive, preferential, or cooperative working arrangements among themselves or with one or more marine terminal operators or non-vessel-operating common carriers;
 - (6) control, regulate, or prevent competition in international ocean transportation; and
 - (7) regulate or prohibit the use of service contracts.¹⁹

In addition to clarifying the scope of the carriers' antitrust immunity, the 1984 Act altered the process by which agreements became effective. Prior to 1984, agreements were not effective until affirmatively approved by the FMC. The hiatus between filing and approval could, on occasion, be lengthy.²⁰ Under the 1984 Act, agreements become effective in 45 days unless the FMC seeks injunctive relief or requests additional information from the filing parties. The FMC can seek an injunction in U.S. District Court to stop the operation of an agreement if the FMC believes the agreement "is likely, by a reduction in competition, to produce an unreasonable reduction in transportation service or an unreasonable increase in transportation cost."²¹ Up to the present time, no agreement has been challenged under this provision of the 1984 Act. "The [FMC] has not had

¹⁹ Service contracts are arrangements between an individual shipper and a carrier (or conference). The shipper agrees to provide a specified amount of cargo over a specified time period in return for the carrier's agreement to transport the cargo at specified rates over specified routes.

²⁰ See FMC Report, pp. 102 and 571.

²¹ Shipping Act of 1984, section 6(g).

occasion to seek to enjoin the operation of an agreement on the basis that it contravened the section 6(g) general standard."²²

It is important to note that certain provisions in the 1984 Act allow opportunities for increased price competition. One such provision requires that all conference agreements provide conference members the right to engage in "independent action." This right permits conference members to offer to carry specific cargo at rates lower than those filed by the conference. Conferences require members who engage in independent action to provide advance notice to the conference. The Act specifies that the advance notice period can be specified by the conference but may not exceed 10 days.²³ Prior to the 1984 Act, most conferences prohibited members from engaging in independent action. Like standard tariff items, the rates available under independent action must be publicly filed with the FMC.

Another provision of the 1984 Act potentially providing greater opportunity for price competition specifically authorizes conferences to file service contracts. These are contracts between a carrier (or conference) and a shipper specifying a minimum volume of cargo to be transported over

²² FMC Report, p. 116. However, the FMC has requested additional information from filing parties and determined afterward that none of the proposed rates violated section 6(g).

²³ Section 5(b)(8) states the "each conference agreement must . . . provide that any member of the conference may take independent action on any rate or service item required to be filed in a tariff under section 8(a) of this Act upon not more than 10 calendar days' notice to the conference and that the conference will include the new rate or service item in its tariff for use by that member, effective no later than 10 calendar days after receipt of the notice, and by any other member that notifies the conference that it elects to adopt the independent rate or service item on or after its effective date, in lieu of the existing conference tariff provision for that rate or service item."

a given time period at a specified rate.²⁴ These contracts also may include specifications concerning the required level of service, including assurances over space availability and transit time. The items subject to the service contract may be more narrowly defined than those found in a standard tariff. Still, the Act states that the essential terms of the contract must be published and offered to all "shippers similarly situated."²⁵ Prior to 1984, service contracts were not used by conferences. Rather, shippers were charged according to the tariff schedule that the conference had filed at the FMC. By providing a flexible alternative to standard tariffs, and by being available to "similarly situated shippers", service contracts might foster competition among carriers.

The FMC has not yet resolved whether the right of independent action extends to service contracts. That is, it is not clear whether conferences can prohibit their members from negotiating directly with shippers and, therefore, confine the carriers to the terms of the service contracts negotiated and filed by the conference. At the moment, this issue is the source of controversy.²⁶ On the one hand, the Act clearly states that some

²⁴ Both individual carriers and conferences are allowed to enter into service contracts.

²⁵ Section 8(c).

²⁶ The FMC Report, p. 12, notes that carriers oppose, while shippers support, requiring independent action on service contracts. One interpretation of the statute might permit independent action on service contracts. Section 5(b)(8) provides for "independent action on any rate or service item required to be filed in a tariff under section 8(a)." Section 8(c), which covers service contracts, requires that a concise statement of the terms of the contract be made available in "tariff format." However, the FMC Report at 677 notes that the legislation's intent was to permit conferences to prohibit independent action on service contracts if they so desired.

time-volume arrangements must be subject to independent action.²⁷ On the other hand, the Act separates service contracts from all other contracts.²⁸ The resolution of this dispute could affect shipping rates. Subsequent to the 1984 Act, some conferences allowed their members individually to enter service contracts with shippers. Due to downward price movements that resulted, these conferences later prohibited carrier-shipper service contracts. By 1986, independent action service contracts by conference members were eliminated. These contracts were replaced by either conference-shipper agreements or a prohibition on service contracts altogether.²⁹ While the FMC has not challenged conference agreements that preclude "independent action" on service contracts, no definitive judgment has been rendered on this issue.

In sum, the 1984 Shipping Act had both anticompetitive and procompetitive features. By clarifying the carriers' antitrust immunity and streamlining the approval process, the Act should make it easier to reach and file conference agreements. However, the provisions concerning mandatory independent action and carrier-shipper service contracts should limit the ability of conferences to enforce agreements that set

²⁷ Section 8(b) permits tariffs filed under section 8(a) to "vary with the volume of cargo offered over a specified period of time." All tariffs filed under Section 8(a) must be subject to independent action.

²⁸ To further complicate matters, section 10(c)(6), which lists prohibited acts, states that "no conference or group of two or more common carriers may . . . allocate shippers among specific carriers that are parties to an agreement or prohibit a carrier that is party to the agreement from soliciting cargo from a particular shipper, except as otherwise required by the law of the United States or the importing or exporting country, or as agreed to by a shipper in a service contract." Thus, it is unclear whether the lack of independent action on service contracts effectively prohibits a carrier from soliciting cargo from a particular shipper.

²⁹ FMC report, p. 654.

anticompetitive prices. Conference-shipper service contracts increase the options available to shippers, but their impact on shipping rates is not clearcut.

IV. The Rationales for Regulation

The rationales advanced by the FMC for the continuation of a regulated conference system hinge on three main arguments.³⁰ First, it is contended that there exist substantial economies of scale for ocean carriers. These economies purportedly arise because large carriers can more efficiently manage their cargo capacity by switching among routes in response to demand fluctuations. Further, customers perceive a quality improvement whenever a firm can provide more frequent service along a given route, and larger firms, with more ships, are better able to provide more frequent service than smaller firms. Because of these scale advantages, proponents of regulation argue that, absent regulation, the industry would be dominated by a small number of firms which collectively possess substantial market power. Under such circumstances, regulations that constrain the pricing power of such firms (e.g., price cap regulations) could, in principle, improve social welfare.³¹ The FMC is statutorily empowered to disapprove rate filings that reflect the exploitation of market power, although this authority has only rarely been exercised.

³⁰ The arguments below parallel those on pages 24 and 25 of the FMC Report.

³¹ The existence of natural monopoly or natural oligopoly would not, by itself, provide a compelling rationale for the imposition of minimum prices or entry restrictions.

Second, it is argued that "destructive" competition would prevail in the absence of conference agreements. Although widely used in the nontechnical literature on regulated industries, there have been relatively few attempts to define destructive competition in an economically rigorous fashion.³² However, Kahn's³³ description of destructive competition appears to capture the flavor of this notion as well as any:

The major prerequisites for competition to be destructive are fixed or sunk costs that bulk large as a percentage of total cost; and long-sustained and recurrent periods of excess capacity. These two circumstances describe a condition in which marginal costs may for long periods of time be far below average total costs. If in these circumstances the structure of the industry is unconcentrated -- that is, its sellers are too small in relation to the total size of the market to perceive and to act on the basis of their joint interest in avoiding competition that drives price down to marginal cost -- the possibility arises that the industry as a whole, or at least the majority of its firms, may find themselves operating at a loss for extended periods of time.

The destructive competition rationale for regulation, at least as defined by Kahn, seems at odds with the "natural monopoly" rationale for regulation, as it involves a large, rather than small, number of firms, and a price that is "too low," rather than "too high." Its regulatory implications would seem to be strikingly different from those of the "natural monopoly" justification, as it would seem to call for the establishment of minimum, not maximum, prices, as well as investment controls.

These two rationales for regulation are potentially reconcilable by the modern literature on the *sustainability* of natural monopoly.³⁴ This

³² See Sharkey (1982, ch. 6), for an attempt to develop a theory of destructive competition. Also see Bittlingmayer (1982).

³³ Kahn (1971), p. 173.

³⁴ See Sharkey (1982), chapter 5.

literature shows that *if* an industry is a natural monopoly,³⁵ it is possible that there might not exist prices that allow the monopolist simultaneously to (1) clear the market (produce all that is demanded at that price), (2) cover its costs, and (3) deter entry.³⁶ Under such conditions, it is conceivable that a market will experience excessive entry by firms of suboptimal scale, with prices exhibiting substantial volatility as a result of this inefficient entry.³⁷ If an industry could be demonstrated to have the characteristics of an *unsustainable* natural monopoly, then there might be some justification for regulating both minimum prices and entry into that industry.³⁸

A third argument for regulation is that U.S. carriers cannot compete effectively because of their higher labor costs, and because of the operating

³⁵ An industry is a natural monopoly if and only if the costs of producing any given level of output are minimized by single firm production.

³⁶ The natural monopoly literature can be extended to allow for natural oligopolies, that is, industries in which it is efficient for a small number of firms to supply the market. Like natural monopolies, natural oligopolies can be unsustainable in that there might not exist prices that allow the firms simultaneously to (1) clear the market, (2) cover their costs, and (3) deter entry. Recent analysis using the theory of the core stresses the importance of "avoidable costs", which are costs that a firm must expend to open for business but which do not vary with the level of output. (See, e.g., Telser (1985)) When avoidable costs are large, firms face declining average total costs over a substantial range of output. Under such circumstances, the theory of the core shows that certain demand and costs conditions can prevent a stable equilibrium from being attained. In the jargon of core theory the core is "empty", but collusive arrangements among the firms in the industry can impose an equilibrium where natural market forces fail. It is difficult to establish empirically whether the cost and demand conditions consistent with an empty core exist in a given market. A recent paper by Sjostrom (1989) concludes that data from the ocean common carrier industry supports the theory of the core. His empirical test, however, did not include cost data from firms in the industry. Given that industry cost conditions are central to the theory of the core, his conclusion must be considered preliminary at best.

³⁷ See Brock and Evans (1983), pp. 71-76.

³⁸ The FMC regulations prohibit conferences from placing restrictions on conference membership.

and construction subsidies granted to foreign carriers by their governments. It is alleged that the conference system gives U.S. carriers sufficient control over shipping rates to ensure their continued survival and thereby serves a national security interest. The FMC Report notes, however, that this rationale imposes costs by permitting less efficient firms to survive.³⁹

V. An Evaluation of the Three Rationales for Regulation

None of the three arguments presents a compelling case for regulating the shipping industry. Consider first the argument that the industry naturally tends toward a monopolistic or oligopolistic structure. A necessary precondition for either outcome is the existence of substantial economies of scale. This means that larger firms can provide services at lower average cost than smaller firms.

Econometric studies of this industry suggest that economies of scale do not exist in maritime transportation.⁴⁰ In addition, information contained in the FMC Report is consistent with the conclusion that large firms do not necessarily have any cost advantages. Even in a regulated environment, if larger firms had lower costs, we would expect them to grow, by merger or otherwise, until they dominated the market. The following table shows, however, that in 1988, trades typically included numerous carriers, some with

³⁹ FMC Report at 25: ". . . conferences offer an alternative for high-and low-cost firms to survive in a relationship which lessens the competitive environment."

⁴⁰ See Kyle (1984), Frankel (1982), Olin (1982), and Devanney et al. (1975). Also, three studies that review the empirical literature conclude that there are no tendencies toward natural monopoly in ocean shipping. See, Scherer (1979), United States Department of Justice (1977), and McGee (1960).

very low market shares, and four-firm concentration ratios in the low to moderate range.⁴¹

**Number of Carriers, Concentration, and
Market Shares: Various Trades - 1988**

	Total Number of Carriers (No. of conf. members <u>in parentheses</u>)	Market Share of Largest <u>Carrier</u>	Four- firm conc. <u>ratio</u>	No. of firms with a market share <u>of 3% or less</u>
US-Far East N. Pacific	30 (13)	12.8%	39%	18
US-Singapore/Malaysia	16 (7)	25.4	65	6
US S. Atlantic-N. Europe	28 (10)	23.8	55	19
US Atlantic-Italy	25 (9)	14.8	42	13

In addition, entry and exit do not appear difficult in these markets, further suggesting that if larger firms had significantly lower costs they would, over time, replace smaller firms. Chapter 10 of the FMC Report catalogs the number of entrants and exiters from various trade routes. For example, in the US-Far East Trade, seven carriers entered and fourteen carriers exited between 1984 and 1988. Similarly, in the US-Northern Europe Trade, sixteen carriers entered and eight carriers exited between 1984 and 1988.⁴² Furthermore, the new entrants have proved viable.⁴³ The

⁴¹ FMC Report, pp. 276, 283, 289, 294. The four-firm concentration ratio is the share of the market controlled by the largest four firms.

⁴² FMC Report, pp. 317 and 319. Later in the report, the FMC states that "not only are there few legal barriers to entry in the US trades, but there are few economic barriers." FMC Report, p. 577.

⁴³ In some instances, and in the Atlantic trade in particular, the new entrant represents an existing firm seeking to expand its service offerings. FMC Report, p. 264.

following table provides, for various routes, the share of total capacity provided in 1988 by firms that did not serve those routes in 1984.⁴⁴

**Share of Total Capacity Provided by New Entrants
1988: Various Routes**

<u>Route</u>	<u>Percent of Total Capacity Provided by New Entrants</u>
U.S.--Far East North Pacific (outbound)	10.1%
U.S.--Far East South Pacific (outbound)	46.7
U.S.--Northern Europe (outbound)	26.5
U.S.--Italy and Mediterranean (outbound)	48.1

In sum, the evidence suggests that large firms in the ocean shipping industry do not enjoy a cost advantage over smaller firms, and that entry and exit into the industry is largely unobstructed. Such conditions weaken the argument that regulation is needed to prevent the industry from evolving into one dominated by a few large firms capable of wielding substantial market power.⁴⁵

⁴⁴ FMC Report, pp. 276, 277, 283, 289, 290, 294, and 295. These pages list the firms active in various trades in 1984 and 1988, and their shares of capacity provided. The figures in the table are the sum of the market shares for firms that are listed for 1988 but not for 1984.

⁴⁵ Even if the argument is accepted that large carriers due to their greater flexibility enjoy cost advantages over small carriers, it appears that smaller carriers might obtain similar flexibility via private contracting. For example, smaller carriers could enter into space chartering agreements to smooth out demand fluctuations. A carrier that enters into a space chartering agreement agrees to provide vessel capacity for the use of another carrier (or carriers). The FMC Report notes that the use of such agreements has increased significantly since 1984, and that they "permit more efficient use of vessel capacity." (FMC Report, p. 107) While such contracts would be subject to antitrust scrutiny if the industry's immunity were lifted, they would violate the antitrust laws only if they were deemed to lead to anticompetitive outcomes. Under current law, the carriers would be offered the opportunity to demonstrate that the contracts improved efficiency, thereby leading to lower costs and lower prices to shippers. Space chartering agreements are described in greater detail on pages 106-107 of the FMC Report.

The argument that regulation is needed to prevent "destructive competition" is also not persuasive. Destructive competition, it will be recalled from Section IV, arguably may occur in industries characterized by fluctuating demand and a high ratio of sunk to total costs.

Ocean liner markets fail to exhibit the high market-specific sunk costs that are a key condition for destructive competition.⁴⁶ Ships are mobile assets that, in some circumstances, may be transferred from less profitable to more profitable geographic markets in response to fluctuations in demand. The FMC Report notes that carriers in certain regional markets can easily alter their port call patterns in response to changing market conditions.⁴⁷ Furthermore, carriers and shippers can negotiate long term contracts to minimize the risks associated with uncertain demand and supply conditions.⁴⁸

Finally, with respect to the third argument justifying regulation (i.e., that the conference system is needed to ensure the survival of U.S. carriers) we note that the conference system seems a very indirect (and possibly inefficient) means to guarantee a strong domestic merchant marine. If some U.S. carriers are less efficient than their foreign counterparts, and if it were determined that they should survive nonetheless, then direct subsidies

⁴⁶ There is also little evidence in support of the proposition that shipping markets are unsustainable natural monopolies vulnerable to inefficient small scale entry. None of the empirical studies of this industry have been performed at a sufficient level of sophistication to generate useful insights into this issue. For an illustration of how this issue might be approached, see Evans and Heckman (1984).

⁴⁷ FMC Report, p. 165.

⁴⁸ While the theory of the core stresses "avoidable costs" rather than sunk costs, the difference does not appear important in this case. Because ships are mobile assets, and because long term contracting is available, ocean carriers have latitude in deciding where and whether to operate their ships. That latitude suggests that carriers will operate their ships on routes least burdened by excess capacity, making destructive competition less likely.

to the carriers might be appropriate, not antitrust immunity, since the former costs U.S. consumers less. To the degree that the conference system and its antitrust immunity fosters supracompetitive shipping rates, it benefits all carriers, domestic and foreign alike, at the expense of U.S. consumers. A direct subsidy could provide comparable assistance to U.S. carriers without the added expense of subsidizing foreign carriers as well.⁴⁹

VI. The Potential Costs of Regulation

Currently, regulations permit ocean common carriers to establish conferences to set prices and other terms of sale jointly. In general, coordinated activity by competing sellers raises the concern that the sellers will reach agreements that further anticompetitive outcomes, that is, prices higher than and output levels lower than competitive levels. Still, not all coordinated activity by competing sellers is troublesome. Under some circumstances, such activity could provide real efficiencies that could reduce prices and improve service.⁵⁰ This section discusses the potential costs of regulation *under the assumption* that conference agreements, which are

⁴⁹ The Merchant Marine Act of 1936 established two types of subsidies for ocean common carriers: construction-differential subsidies and operating-differential subsidies. In recent years, no funding has been provided for construction-differential subsidies. No new operating-differential subsidies have been granted for several years, but payments continue for subsidies made in the past. The merits of a funding this, or any, subsidy program would require an analysis of the industry that is beyond the scope of this report.

⁵⁰ For example, space chartering agreements by competing carriers could allow those carriers to utilize their available capacity more efficiently, thereby lowering their costs and, possibly, shipping rates. FMC Report, p. 107.

enforced by the FMC,⁵¹ help foster anticompetitive outcomes.⁵² In this situation, removal of the conference system would provide an impetus to reduce capacity, increase utilization, and lower prices.⁵³

In the following, we consider the profit-maximizing behavior of a conference in both the short run and the long run. The key difference between short run analysis and long run analysis is that the former assumes a constant supply of worldwide cargo capacity while the latter permits worldwide capacity to increase either by introduction of new ships by firms already in the industry or by entry of new firms. In the short run, the conference system might facilitate collusive agreements that provide conference members supracompetitive profits. Because entry into ocean

⁵¹ The FMC's enforcement role is important. Any cartel that wishes to maintain prices above the competitive level must detect and punish discounting from the cartel price. (See Stigler (1964)). In general, detection of cheating can be a difficult task. In the ocean shipping industry, however, conference shipping rates must be filed with the FMC, which has the authority to impose civil penalties on conference members detected violating a conference agreement.

⁵² The validity of this assumption will be limited by several factors. First, the presence of independent carriers can restrain a conference's ability to raise prices. Second, a conference carrier can leave the conference at any time and become an independent carrier (and possibly charge lower rates) if it believes that membership in the conference no longer serves its best interest. Third, the 1984 Act requires that conference carriers be given the right to engage in independent action, which might also restrict the conference's ability to keep shipping rates at anticompetitive levels.

⁵³ If conferences only provide efficiencies, then regulatory changes that weaken a conference's ability to enforce its agreements (such as the mandatory independent action provision contained in the 1984 Act) would increase industry costs and shipping rates. In Section VII(B) we present a statistical model which concludes that shipping rates were significantly lower in 1987 than they were in either 1981 or 1984. The finding that shipping rates declined significantly after the passage of the 1984 Act is difficult to reconcile with the view that conference agreements only provide efficiencies. This is particularly true if the 1984 Act does not interfere directly with a conference's ability to provide services efficiently. If the 1984 Act does so interfere, it is not clearly demonstrated in the FMC Report.

shipping appears largely unobstructed, we would expect long run profits in this industry to approach the competitive level.

In the short run, a conference that controls a significant proportion of the trade in a given route would have an incentive to raise price above the competitive level. A profit-maximizing conference may be expected to operate as a price-setting cartel. In establishing its price, the cartel would be concerned about the marginal effect of a price increase on its profits. If demand is sufficiently unresponsive, then the cartel may raise price, and would continue to do so until a range is reached where any further increase would reduce revenues and therefore profits. Regardless of the size of its membership, the cartel is inclined to maintain prices within this "elastic" range.⁵⁴

Where adequate market power exists, the cartel price may lie above the level needed to cover the minimum attainable average cost of operation.⁵⁵ Such a price would provide supranormal profits to existing conference members, and restrict the supply of shipping services below the efficient level. The costs associated with the conference's ability to raise price and

⁵⁴ The "elastic" range of a demand curve is that range where a one-percent increase in price results in a more-than-one-percent decline in the quantity demanded. Hence, any further price increase would lower the revenue (price X quantity) collected by the firm (or cartel). If revenue increased with a price increase, then the cartel would obviously raise price. This is reinforced by that fact that a higher price leads to lower output, and thus a reduction in total costs. When demand is elastic, the cartel balances the loss in revenue with the savings in costs resulting from a higher price.

⁵⁵ Conferences have less ability to maintain prices at these levels when independent carriers can easily expand their supply to the market. Carriers can change capacity along a given route by reallocating their available fleet of ships. These short-run adjustments are constrained, however, because some potentially mobile ships may be rendered immobile by the need to honor previous commitments and because the number of ships in the worldwide fleet is finite.

reduce output arise in large measure from the FMC's active enforcement of cartel agreements.

Whenever short-run profits exceed competitive levels, firms have an incentive to enter the industry. Consequently, we would not expect the supranormal profits earned by conferences in the short run to persist in the long run. The effects of entry on prices, however, will depend on whether the entrant chooses to join the conference.

If the new entrant joins the conference, it agrees to charge the conference price and to restrict its quantity of shipping services provided so that the cartel price can be maintained.⁵⁶ By contrast, an independent entrant would set its prices and quantities unilaterally. If the new entrant were relatively large compared to the size of the market, its entry as an independent might cause the conference to dissolve, thereby forcing prices downward toward the competitive level. Under such circumstances, the new entrant might prefer to enter as a conference member rather than as an independent because the former might drive profits toward the competitive level less quickly.⁵⁷

Suppose that the new entrant chooses to join the conference. Since the cartel continues to keep price above minimum average cost, entry simply increases the competition for shippers, thus resulting in reduced capacity

⁵⁶ In addition, maintenance of the cartel price requires that existing conference members respond by reducing their output below their short run levels.

⁵⁷ We note here that the evidence from the economics literature and the FMC Report suggests that successful entrants need not be large relative to the market. See the discussion in Section V, infra.

utilization.⁵⁸ Thus, one possible outcome of an effectively anticompetitive conference system is an inefficient industry with excess capacity and higher prices than would prevail in the longer term under a competitive environment. In a more competitive environment, in which the FMC did not enforce the cartel's agreements, the long-run equilibrium prices would tend to equal minimum attainable average cost.⁵⁹

Alternatively, excess capacity may result from excess service-quality competition when conference carriers can provide various quality levels. If conferences have the ability to set prices but do not allocate service among their members or pool revenues, then firms belonging to the conference can compete for additional business by increasing the quality of service offered. Since a key quality variable is the timeliness of shipment, and this depends

⁵⁸ Periods of excess capacity have plagued the ocean shipping industry (FMC Report, p. 53). When ships are not operating at full capacity, average costs would necessarily be lower if the same amount of cargo were hauled in fewer ships. Under a competitive environment, the presence of any excess capacity would more likely lead to a fall in price and more efficient capacity utilization in the long run. See Patinkin (1947) and Cassidy (1981) for a similar analysis of cartel behavior under free entry.

Further, the excess capacity of conferences gives them flexibility in taking concerted action to deal with independent carriers. The conference can use its capacity to deter independent carriers that act too aggressively. Historically, this practice had occurred through the employment of conference-owned "fighting ships" which competed directly for the customers sought by independent carriers. This practice was outlawed by the Shipping Act of 1916.

⁵⁹ We essentially are considering a conference where there is no revenue-sharing agreement. Yet, even in conferences that pool revenues, some incentive to overinvest in capacity exists. When conferences pool revenues, a prospective conference member needs to establish capacity in order to receive a portion of the conference's revenue. If that firm increases its capacity, then the conference may be forced to grant a larger revenue share to it. The conference may be inclined to react to capacity increases in this manner because the potential damage to the conference from losing a member increases along with the firm's size. So, a firm's capacity commitment gives it power in negotiating satisfactory revenue shares within the conference.

on the frequency of operation, firms would have an incentive to compete away profits by overinvesting in capacity and new technology.⁶⁰ By increasing service quality, each firm's costs are raised until the average cost of transporting cargo equals the price set by the conference.⁶¹ We see some evidence to suggest that conference carriers offer a different quality of transport services than independent carriers. In the U.S. trades to and from the Far East North Pacific, Far East South Pacific, Northern Europe, and Italy, the conference carriers transport higher-valued commodities than the nonconference carriers and have generally shorter transit times.⁶² Since the carrying costs for unsold merchandise increase with the value of the product, we would expect that higher-valued goods would be relatively more responsive to quicker, higher-quality transport services.

Thus, when new entrants join the conference, profits are driven toward the competitive level by investment in excess capacity and by excess service quality competition; prices remain above the competitive level. If, instead, the new entrant chooses to enter as an independent, price competition would be likely to erupt. Such price competition might eventually undermine the conference's ability to set supracompetitive prices.

If conferences have market power sufficient to raise prices above the competitive level, then elimination of the conference system may cause firms to act more competitively and more efficiently, implying lower costs and

⁶⁰ The regulated airline industry, in which the Civil Aeronautics Board regulated prices, is commonly cited as an example of excess quality competition. See Douglas and Miller (1974) and Morrison and Winston (1986).

⁶¹ This point, made by Jansson (1984) and others, is explained in the FMC Report, p. 412.

⁶² FMC Report, pp. 271-287 and pp. 314-324.

lower prices to consumers.⁶³ Excess capacity would be reduced because price competition among firms leads to prices based on the minimum cost of production for the service levels demanded.⁶⁴

The existing regulatory structure also may lead to other inefficiencies. For example, tariff filing requirements, which prevent carriers from rapidly adjusting their prices to changing competitive conditions, reduce economic efficiency by inhibiting prices from adjusting when demand changes. As a result, average costs could rise due to less efficient capacity utilization.⁶⁵

⁶³ The cost of regulation is potentially high. Without taking into account the value of potentially higher quality service offered by conferences, Cassell (1984) estimated that the conference system forced outbound shippers to pay conference members an additional \$941 million to \$1.64 billion in 1979. He formulated this estimate by assuming that conferences had succeeded in raising prices 15-30 percent above competitive levels (citing Devanney et al.'s (1975) study and the DOJ report (1977)). Given that U.S. carriers only account for 14.5 percent of the market (FMC Report, p. 77), it is likely that their share of these gains is significantly smaller. The economic loss is not merely represented by the higher transportation rates paid by existing shippers; some would-be shippers cannot send goods abroad due to the higher transport costs. Cassell estimated that the deadweight economic loss would probably range from \$470 million to \$820 million. He formulated these figures by assuming that ocean shipping services are elastically supplied.

⁶⁴ One provision of the 1984 Act that may have served to diminish the conference's ability to charge prices above the competitive level is the provision that mandates the right of conference members to engage in independent action. We discuss this provision, and the effects of the Act generally, below in Section VII(B).

⁶⁵ Independent action by conference members and price cutting by independent carriers contributes to more flexible prices. Even greater flexibility might arise if the restrictions remaining in the 1984 Act, such as the ability for conferences to require their members to provide notification prior to engaging in independent action and to limit their members from engaging in independent action on service contracts, were lifted.

VII. Effects of the 1984 Shipping Act

A. Service Contracts and Independent Action

The ocean shipping industry has responded to the 1984 Act's provision that permits service contracts between shippers and either individual carriers or conferences. Service contracts are arrangements between individual shippers and individual carriers (or conferences) to transport a specified quantity of cargo over a specified time period. Since 1984, service contracts have been used extensively in some inbound trades, although they are less popular in outbound trades. The following table shows the percentage of conference-carried trade that travelled under service contracts in the 1985-87 period:⁶⁶

**Percentage of Conference Trade Under Service Contract, 1985-87
(Selected Routes)**

<u>Route</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
U.S. North Atlantic-Germany (inbound)	36%	59%	71%
U.S. North Atlantic-Germany (outbound)	12	30	32
U.S. North Atlantic-Italy (inbound)	0	2	1
U.S. North Atlantic-Italy (outbound)	0	1	0
U.S. Pacific Coast-Japan (inbound)	NA	NA	NA
U.S. Pacific Coast-Japan (outbound)	46	31	0
U.S. Atlantic Coast-Japan (inbound)	NA	NA	NA
U.S. Atlantic Coast-Japan (outbound)	6	9	0
U.S. Pacific Coast-Taiwan (inbound)	20	60	60
U.S. Pacific Coast-Taiwan (outbound)	12	5	0
U.S. Atlantic Coast-Taiwan (inbound)	17	40	55
U.S. Atlantic Coast-Taiwan (outbound)	36	52	72

The table indicates a particularly heavy use of service contracts on the inbound German and Taiwan trades. In the relatively crowded inbound trades, space availability and timely delivery may make service contracts a

⁶⁶ FMC Report, pp. 162, 169, 178, and 185. These figures pertain to conference carriers only, i.e., they exclude independents. The largest independent carrier, Evergreen, filed more service contracts in the 1984-88 period than any other carrier. FMC Report, p. 620.

particularly desirable arrangement. Because a shipper cannot obtain a service contract without first providing information concerning the commodity involved, the volume of cargo, and the desired quality of service, the heavy use of this type of transaction may imply a greater ability of conferences and carriers to respond to individual demand and cost conditions.

In theory, service contracts can be negotiated between shippers and conferences or between shippers and individual carriers. However, conferences can decide whether to allow their members to negotiate service contracts individually with shippers or whether to channel all contracts with shippers through the conference at rates and terms determined by the conference members jointly. Most conferences have prohibited their members from negotiating service contracts directly with shippers. One temporary exception arose between 1984 and mid-1986 when some conferences in the Far East trade allowed their members to enter service contracts with shippers. Since mid-1986, however, the Far-East conferences, like all others, have prohibited their members from entering service contracts not negotiated through the conference.

The following table contains the percentage of service contracts issued by conferences and by individual carriers. The conference percentage includes service contracts filed by the conference itself. The carrier percentage includes service contracts entered into by individual carriers, both conference and nonconference. Between 1984 and mid-1986 some of these contracts involved conference members; after 1986, all of these contracts involved independent carriers. The table indicates that most service contracts have been between shippers and individual carriers. Note

that the proportion of total service contracts issued by conferences was somewhat higher after mid-1986.

**Percentage of Service Contracts Issued By Conferences
and Individual Carriers, 1984-88**

<u>Year</u>	<u>Conferences</u>	<u>Carriers</u>
1984	7%	93%
1985	24	76
1986	28	72
1987	40	60
1988	33	67

Service contracts would not exist unless both the conferences and shippers found them mutually beneficial.⁶⁷ However, contracting would likely be more efficient if contracts between shippers and individual carriers were permitted by conferences. A shipper-conference service contract has negative aspects that would not arise under a shipper-carrier contract. The former type of contract may allow conferences to set prices for these agreements that may not accurately reflect the competitive incentives of the individual carriers. By contrast, a shipper-carrier contract would be more flexible in addressing the competitive conditions facing individual firms and also the individual demands of shippers. Further, the elimination of the need for coordinated action in changing contract terms would allow carriers to adjust more rapidly to changing market conditions.

⁶⁷ Service contracts protect the shipper against adverse movements in future transportation rates and reduce search costs involved in finding carriers with available space. Service contracts also improve the information possessed by the shipper concerning future transportation costs, which allows the shipper to choose future output more efficiently.

For members of the conference, contracting reduces the search costs involved in locating customers to fill cargo space in the future. The conference's information concerning future demand improves, which may provide some help to conference members in their capacity decisions.

The Far-East conferences' decision to prohibit direct negotiations between their members and shippers may have contributed to the upward momentum in inbound and outbound transport rates between the United States and the Far East. The following table compares the pattern of post-1984 rates in the Taiwan trade with those in the Germany trade.⁶⁸

**Rate Behavior in the Inbound and Outbound Germany
and Taiwan Trades, 1984-87
(2nd quarter rates, in dollars)**

<u>Inbound Routes</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
U.S. South Atlantic-Germany (inbound)	\$ 97	\$127	\$128	\$146
U.S. North Atlantic-Germany (inbound)	134	129	128	148
U.S. Atlantic Coast-Taiwan (inbound)	146	111	118	140
U.S. Pacific Coast-Taiwan (inbound)	130	78	79	102
<u>Outbound Routes</u>				
U.S. South Atlantic-Germany (outbound)	109	97	80	86
U.S. North Atlantic-Germany (outbound)	116	94	81	88
U.S. Atlantic Coast-Taiwan (outbound)	121	96	60	83
U.S. Pacific Coast-Taiwan (outbound)	38	31	29	40

When examining these numbers, note that: (1) conference members in the Germany trade were prohibited from entering into service contracts during the entire period; and (2) conference members in the Taiwan trade faced a similar prohibition only after mid-1986. The table indicates that rates fell precipitously between Q2 1984 and Q2 1985 in the inbound Taiwan routes, remained relatively stable until Q2 1986, and then started climbing in 1987. Since their low in the 1985-86 period, rates have rebounded by rising over 50 percent on the inbound Taiwan trade.⁶⁹ By contrast, rates in the inbound Germany trade either rose or remained stable over this period. These contrasting trends suggest that shipping rates are lower when

⁶⁸ Rate levels estimated from Figures 8-8, 8-9, 8-19, and 8-20 in FMC Report (pp. 170, 186, and 187).

⁶⁹ FMC report, pp. 186-187.

conferences allow their members to enter into service contracts directly with shippers. Such an environment might increase the number of carriers competing for service contracts, which creates downward price pressure.

The figures for the outbound trades are less striking but qualitatively similar. While both the outbound Taiwan and Germany trades showed declining transport rates between Q2 1984 and Q2 1986, the most pronounced fall occurred in the U.S. Atlantic-Taiwan trade. However, between Q2 1986 and Q2 1987, the period during which conference members in both trades were prohibited from negotiating directly with shippers, the outbound Taiwan trades experienced stronger upward rate movements than the outbound Germany trades.

All-in-all, the conveniences obtained through contracting are apparently being offered at a discount when compared to standard tariff rates. When the FMC surveyed shippers and carriers and asked how service contract rates compared to standard tariff rates, the option chosen most often by both groups surveyed was that service contract rates were 11 to 25 percent lower.⁷⁰

The preceding discussion noted that service contracts were more prevalent on inbound trades between 1984 and 1987 than they were on outbound trades. By contrast, independent action was far more prevalent on outbound trades. The difference was most likely due to the imbalanced nature of U.S. trade -- the demand for inbound shipping services far exceeded the demand for outbound shipping services during this period. The excess capacity on outbound routes probably allowed outbound shippers to wait until the time of shipment to locate a carrier and arrange a favorable

⁷⁰ FMC Report, p. 636.

independent action rate.⁷¹ The following table contains the percentage of conference trade transacted under independent action rates during the 1985-87 period:

**Percentage of Conference Trade Under Independent Action, 1985-87
(Selected Routes)**

<u>Route</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
U.S. North Atlantic-Germany (inbound)	0%	0%	0%
U.S. North Atlantic-Germany (outbound)	0	0	0
U.S. North Atlantic-Italy (inbound)	25	49	44
U.S. Pacific Coast-Japan (inbound)	NA	NA	NA
U.S. Pacific Coast-Japan (outbound)	40	38	61
U.S. Atlantic Coast-Japan (inbound)	NA	NA	NA
U.S. Atlantic Coast-Japan (outbound)	29	40	59
U.S. Pacific Coast-Taiwan (inbound)	25	21	2
U.S. Pacific Coast-Taiwan (outbound)	58	64	81
U.S. Atlantic Coast-Taiwan (inbound)	42	0	6
U.S. Atlantic Coast-Taiwan (outbound)	4	5	0

The table indicates a near absence of independent action on inbound trades (with the exception of the Italy trade.) The lack of independent action in the Germany and Atlantic Coast-Taiwan trades could, in theory, pose a competitive concern, unless regular tariff and service contract rates were to reflect the potential price pressure exerted by the availability of independent action.

It appears that the implementation of independent action has produced some procompetitive effects where it has occurred.⁷² When the FMC

⁷¹ The FMC Report makes this point in several places. See, e.g., p. 664.

⁷² Generally, independent action occurs more frequently in the outbound trade where excess capacity is relatively larger. Although independent action is not used in the Northern Europe trade, entry of new carriers may ultimately moderate any upward rate movements, particularly if the entrants are independents. As mentioned previously, a net gain of ten carriers has occurred in the Northern Europe trade between 1984 and 1988. Most of the new entrants have been independents. In the Far East North Pacific trade, a net gain of three carriers has occurred over the same period. See FMC Report, pp. 276, 277, 289, 290, and 320.

surveyed shippers and carriers and asked them to compare independent action rates with standard tariff rates, the response chosen most often by both groups was that independent action rates were between 11 and 25 percent lower.⁷³ Moreover, over 58 percent of the shippers surveyed by the FMC responded that independent action had a favorable overall impact and only four percent responded that independent action had an unfavorable overall impact.⁷⁴ Over half of the carriers surveyed indicated that independent action "greatly decreased" shipping rates.⁷⁵

The notification requirements associated with independent action may be dissuading some conference members from using this tool. Currently, the conference must be notified in advance of a carrier's intention to set an independent price. The mandatory notification period may permit the conference to persuade its member against taking such action. In that manner, the notification period delays the price-adjustment process and serves to discourage a conference member from responding quickly to current competitive conditions. Further, the act of notification provides information to the conference that could be used to discipline price-cutting members.⁷⁶

We believe that competition would be enhanced if all carriers were allowed to take independent action without any notification requirements.

⁷³ FMC Report, p. 681.

⁷⁴ FMC report, p. 684.

⁷⁵ FMC report, p. 684.

⁷⁶ Independent action allows carriers to decide whether to "discount" from the tariff price. However, if these discounts have to be announced to the conference, the process of detecting price cutters is facilitated. In theory, the detection of cheating could lead to the adoption of practices to dissuade conference members from discounting in the future. Such behavior could have anticompetitive effects.

would necessarily force carriers, and conferences in particular, to be attentive to the individual needs of members in formulating their tariff policies.

B. Statistical Analysis

To evaluate the effects of the 1984 Act, the FMC collected extensive data on conference shipping rates in various trades.⁷⁷ Chapter 8 of the FMC Report presents and analyzes these data. Two findings cited at the outset of that chapter are:

- (1) "The 1984 Act had little or no effect on the structure of rates. The rate structure refers to the differentiation of rates by commodities in the tariff."⁷⁸ and,
- (2) "There is little evidence to suggest that the 1984 Act itself had a significant impact on rate levels. Market supply and demand relationships better explain the movement of rate levels both before and after the enactment of the 1984 Act."⁷⁹

The FTC staff used FMC data to examine whether the rate structure and rate levels have changed over time.⁸⁰ The analysis finds that nominal rate levels were significantly lower in 1987 and 1984 than they were in 1981,

⁷⁷ Appendix A to Chapter 8 of the FMC Report describes the FMC's data collection process.

⁷⁸ FMC Report, p. 156.

⁷⁹ FMC Report, p. 155.

⁸⁰ After the FMC Report was released, the FMC staff provided the FTC staff the data used by the FMC in its multivariate regression analysis. The FMC's regression analysis and findings are discussed on pages 202-203 of the FMC Report.

and that the rate structure was different in 1987 than it was in 1981.⁸¹ These statistical results are inconsistent with the FMC's conclusions that the 1984 Act did not affect the structure and level of shipping rates. While the results of the FTC staff's analysis are consistent with the position that the 1984 Act contributed to these effects, they should not be considered conclusive because the analysis may have failed to control adequately for all relevant effects.⁸²

1. The Impact of 1984 Act on the Structure of Rates

To assess whether the 1984 Act altered the structure of rates, the FMC Report estimated a multivariate regression model using data from 1981, 1984, and 1987.⁸³ The FMC Report analyzed separately the data from each year, and then assessed the effect of the 1984 Act on the structure of rates by comparing the results from the three analyses. Based on those comparisons, the Report concludes, "[T]he model indicates that the major difference in the rate structure in US liner trades before and after the 1984 Act was due to trade imbalances. The 1984 Act does not appear to have had a major effect on the structure of rates."⁸⁴ The FMC's statistical approach, however, does not permit the use of statistical tests to examine whether the structure of rates has changed.

⁸¹ The FTC staff's findings are based on a multivariate analysis of the FMC data. Appendix A to this document provides a detailed presentation of the FTC staff's statistical analysis and findings.

⁸² Due to significant time constraints, the FTC staff's analysis relied on the data provided by the FMC staff and did not attempt to control for the effect of general macroeconomic variables, such as exchange rates, on shipping rates.

⁸³ FMC Report, pp. 202-203.

⁸⁴ FMC Report, p. 203.

The FTC staff have identified an alternative way to examine the structure of rates. The FTC staff approach is a straightforward variant of the FMC model which, among other things, allows one to test formally (i.e., statistically) whether the structure of rates has changed over time.⁸⁵ The results from the FTC staff's analysis lead to conclusions different from those in the FMC Report concerning the stability of the rate structure over time. In particular, the results imply that the structure of rates has changed over time and that the 1987 structure was significantly⁸⁶ different from the 1981 structure. The FTC staff's analysis, however, does provide formal support for the FMC conclusion that one of the strongest influences on freight rates has been the change in trade flows.

2. The Impact of the 1984 Act on Rate Levels

The data used by the FMC in its regression analysis provide the shipping rates for various commodities in various trades in 1981, 1984, and 1987. The commodities and the routes included in the data are the same in each of the three years. The following table presents the average nominal shipping rates for the years 1981, 1984, and 1987 for the commodities and routes included in the data.

⁸⁵ Appendix A contains details on the FTC staff's statistical analysis and findings.

⁸⁶ In this instance, the term "significantly" indicates statistical significance.

**Average Nominal Rates for 1981, 1984 and 1987
Rates Per Ton, Various Routes
(FMC Data: 78 Observations each year)**

<u>Year</u>	<u>Average Rate</u>
1981	\$203.33
1984	\$185.87
1987	\$173.56

The results in the table show that average nominal rates were lowest in 1987 and highest in 1981. It should be pointed out that no inflation correction has been applied to these rates. If such an adjustment were made, the rates in 1984 and 1987 would be even lower relative to those in 1981.

The next table contains the percentage of the commodities where nominal rates have not risen between 1981 and the later years considered. Only 37% (25%) of the commodities experienced nominal rate increases between 1981 and 1984 (1987). Consequently, during the years after the passage of the 1984 Act, nominal prices have declined, and this decline has been spread over a majority of the commodities included in the FMC analysis.

Percent of Commodities Experiencing No Increase From 1981 Rates

<u>Year</u>	<u>Percent</u>
1984	63%
1987	75%

The FTC staff's statistical analysis can be used to compare the levels of shipping rates in these three years holding constant the effects of other factors, such as the value of the cargo transported and whether the traffic was inbound or outbound. The analysis concludes that, on average, nominal shipping rates were significantly (in a statistical sense) lower in

1984 and 1987 than they were in 1981, and that 1987 rates were significantly lower than 1984 rates. In percentage terms, the analysis suggests that average shipping rates were approximately 10% (16%) lower in 1984 (1987) than they were in 1981. We interpret these results to imply that the 1984 Act, by fostering competition via service contracts and independent action, may have contributed to the reduction in shipping rates over time.⁸⁷ Still, they should not be considered conclusive because the analysis may not have controlled for all relevant effects.

VIII. Common Tariffs For Products of Equivalent Volume and Mass

Section 18(c)(3)(A) of the Shipping Act of 1984 requires that the Federal Trade Commission comment on "the advisability of adopting a system of tariffs based on volume and mass of shipment." The current rate structure in the ocean shipping industry involves tariffs that are differentiated on the basis of the description of the commodity and the weight or measurement of the shipment.⁸⁸

During the hearings prior to passage of the 1984 Act, Congress received testimony from the FTC that this rate structure was discriminatory in regard

⁸⁷ It is worth repeating that no inflation adjustment has been made. Thus, the finding that 1987 rates are lower than rates in 1981 and 1984 is all the more striking. According to the Consumer Price Index for all urban consumers (compiled by the Department of Labor), the aggregate inflation rate between 1981 and 1984 was 14%; between 1984 and 1987 it was 9%. Further, some of the 1987 rates include intermodal rates, which include charges for land-side transportation. If these land-based charges were netted out, the 1987 rates would be even lower relative to 1984 and 1981. The FMC concluded that netting out the land-based charges from intermodal rates would "not be feasible." (FMC Report, p. 207)

Note also the pre-existing downward trend in rates from 1981 to 1984 as an issue potentially worth exploring.

⁸⁸ FMC Report, p. 395.

to the shipment of containers.⁸⁹ From an economic standpoint, price discrimination occurs whenever buyers are charged different rates and the rate differentials are not based entirely on underlying cost factors.⁹⁰ For a pricing scheme (be it regulatory or market-determined) to be efficient, it is crucial that all cost considerations be reflected in the price determination process. If the marginal transportation cost is higher for one commodity than another, then economic efficiency dictates that prices reflect that differential. Consequently, imposing a regulated system of tariffs that ignores cost differentials would be inefficient.

Still, after correcting for cost differentials in handling special cargo, such as breakable, highly valuable, temperature-controlled, or hazardous goods, the question remains whether it is a sensible regulatory proposal to require that any container of cargo be charged the same rate regardless of that container's contents. We believe that regulatory requirements of this nature are unnecessary because an unregulated market would, of its own accord, move prices toward the costs of provision.

The lack of economies of scale in ocean shipping would apparently prevent carriers from price discriminating in an unregulated market. Given that the market share of most carriers operating within a given system of routes is well below 10 percent, the industry can apparently sustain the operation of numerous firms. When many firms operate within a given industry, they typically act as price-takers. Carriers would react quickly to

⁸⁹ Shipping Act of 1983, Hearings on H.R. 1878 before the Subcommittee on Monopolies and Commercial Law of the U.S. Congress House Committee on the Judiciary, statement by James C. Miller III, Chairman, Federal Trade Commission (May 18, 1983).

⁹⁰ See Tirole (1988) pp. 133-134.

ny disparity in the relative profitability of transporting various goods based n the prevailing rate structure. For instance, if the profits net of direct osts were higher for transporting one commodity relative to another, then any carrier would devote more of its capacity to transporting the more profitable cargo. Consequently, the transport rate for that cargo would fall. Thus, we would expect to see competition equilibrate the profitability of transporting various commodities.

In contrast to the previous analysis, the FMC Report theorizes that price discrimination, where firms use market power to set a price above that associated with the marginal cost of provision, may potentially represent an efficient outcome for an industry characterized by substantial overhead costs and inherent joint production.^{91,92} When there are substantial overhead costs involved in production, declining average costs may be present over a large range of output. In such markets, firms cannot set price equal to the marginal cost of production because they will not recoup their overhead. Under these circumstances, it may be efficient for firms to use their market power and price discriminate. This outcome allows firms to set price above

⁹¹ The FMC Report, pp. 411-415, elaborates on theories by Jansson (1974, 1984) and Davies (1983) that postulate that an efficient equilibrium in ocean shipping may involve price discrimination. Firms would still earn a normal return on investment, however.

⁹² Joint production occurs in transport industries because firms have to increase output in significant amounts. For instance, to accommodate more passengers, an airline may have to add another flight. The additional flight can be used to supply a variety of products. If the flight makes a stop between its origin and its destination, then it can choose to offer a through fare or several local fares.

Similarly, a shipping company increases its output of transportation services by either augmenting its fleet or adding another voyage to its schedule. Once the firm has decided to add another voyage, it can then make its cargo space available to a variety of shippers who wish to transport different types of goods.

marginal cost, where the excess receipts are just sufficient to cover overhead costs. In this situation, the industry would be operating with greater economic efficiency as the potential degree of price discrimination increased.⁹³

However, as previously mentioned, there is little evidence to support the notion that there are significant economies of scale in ocean shipping. We would not expect average costs to decline with the size of the carrier. Although there are significant capital costs involved in ocean shipping, most of these capital costs are directly related to a carrier's expenditure on its fleet. As fleet size increases, so does capital expenditure. There is little indication that average costs continuously decline as fleet size increases. Moreover, the mobility of ships may constrain carriers from charging prices not related to the costs of providing shipping services. So, based on underlying cost conditions in the industry, we would not expect price discriminating behavior to arise in an unregulated ocean shipping industry.⁹⁴

To the extent that price discrimination is currently present in the ocean

⁹³ See Tirole (1988) and Spulber (1989) for an explanation of the efficient use of price discrimination, known as Ramsey pricing. The FMC Report refers to this concept on p. 413. The intuition behind this concept is that, when firms need to cover overhead costs in an industry characterized by declining average costs, the method that maximizes the benefits to consumers involves charging low rates to relatively price-sensitive customers and high rates to price-insensitive customers. When firms are limited by entry to earning a normal return on investment, this scheme represents the most efficient method of allocating output. Moreover, if firms can increase the degree of price discrimination, they can earn higher profits at a given output level. Thus, more firms can enter the industry and still earn a normal of return. More customers would be served, generating a more efficient outcome.

⁹⁴ The above analysis of price behavior as it relates to underlying cost conditions is consistent with that applied by Zerby and Conlon (1983) to ocean shipping.

shipping industry, it may be an artifact of an existing regulatory structure that conveys market power.^{95,96}

⁹⁵ A price discriminating monopolist will establish different price-cost margins for different customer groups that reflect differences in demand elasticities for transport services. A common method of testing for the presence of price discrimination is to estimate a relationship between a commodity's freight rate and commodity value. As explained below, a positive relationship *may* suggest that price-discriminating behavior exists because, under very specific assumptions, a profit-maximizing conference with market power would charge relatively higher transport rates for higher-valued commodities.

To understand this empirical approach, note that the elasticity of demand for a factor of production is determined by several factors. These are: (1) the elasticity of demand for the output of the firms purchasing the factor; (2) the ease with which other factors can be substituted for the factor in question; (3) the elasticity of supply of other factors of production, and (4) the share of total costs consisting of expenditures on the factor in question (*See Stigler (1966, pp. 242-244)*). The use of the price of the final good as a proxy for the elasticity of factor demand in empirical studies (such as those listed in the next note) apparently represents an attempt to measure the influence of item (4), the cost share effect. Provided that the other three elasticity determinants are adequately controlled for, this might represent a reasonable approach towards assessing the existence of price discrimination. Otherwise, however, it constitutes a highly imperfect proxy for elasticity of factor demand.

Thus, it is problematic to infer price discrimination from an observed positive relationship between final good price and transport price when the empirical analysis does not take into account the other determinants of the elasticity of demand for shipping services. Consider, for example, the case of a firm that is exporting high value goods to the U.S., where it is a "price taker" in a competitive output market dominated by domestic firms. Price taking behavior in the output market means that the demand curve facing this particular shipper is infinitely elastic (even though the total *market* demand curve in the U.S. for the good conceivably could be quite inelastic). This, in turn, means that this exporter's derived demand curve for the transport services sold by the conference will also be infinitely elastic. Notwithstanding the small share of transport costs in the exporter's total costs, the conference will have *no* exploitable market power *vis a vis* this shipper.

⁹⁶ The evidence concerning the use of price-discrimination by shipping conferences is mixed. Studies by Bennathan and Walters (1969), Heaver (1973), Deakin and Seward (1973), Bryan (1974), Jansson (1974), Zerby and Conlon (1978), Jansson and Shneerson (1986), and others have found a positive relationship between commodity value and freight rate. The FMC also discovers a similar relationship in its own analysis (*see FMC Report, Table 8-14, p. 202*). The FTC's analysis of these data (section VII(B) *infra*) did not confirm the FMC's findings. The statistical significance of the

Tariff Filing Requirements

The general issue of tariff filing is an important one. Since 1961, conferences and independent carriers on U.S. foreign trades must pre-file air freight rates with the FMC.⁹⁷ The requisite notification period is 30 days prior to the effective date of a rate increase in the normal course of business.⁹⁸ The FMC polices the industry to ensure that carriers do not offer unpublished discounts on these rates, a practice known as rebating.⁹⁹ Conferences and independent carriers are also required by the 1984 Act to file their rates on service contracts and include a description of the essential terms of these contracts.

Tariff filing was initially introduced to ensure that carriers did not price discriminate among individual shippers and to make price information easily obtainable. It was also perceived as beneficial in that it encouraged rate stability.¹⁰⁰ Tariff filing also facilitates the FMC's role of policing

coefficients on some commodity-specific variables used in the FTC analysis does suggest that cost or demand factors peculiar to a specific commodity exert an influence on freight rates, however. A link between commodity value and freight rates might reflect differences in the cost of shipping that, notwithstanding other considerations, could arise as a result of different qualities of service provided.

⁹⁷ On domestic routes, tariff filing has been required since 1916.

⁹⁸ FMC Report, p. 495. Ex-post tariff filing with the Federal Maritime Board had been practiced since the 1930's.

⁹⁹ The practice of rebating was effectively outlawed by the Shipping Act of 1916, and remains outlawed under the 1984 Act.

¹⁰⁰ FMC Report, p. 496.

against secret rebating activities.¹⁰¹ As a result, it serves as a cartel-enforcing device to the extent conference carriers do not engage in independent action. In addition, the notification and filing requirements in the case of "independent action" may potentially exert significant anticompetitive pressure.¹⁰² The filing requirement can also facilitate anticompetitive interaction between conferences and independent carriers.¹⁰³

Apparently, the House Committee on the Judiciary noted some of these concerns in its Report on H.R. 1878, the precursor to the Shipping Act of 1984. That Report proposed to eliminate tariff filing and enforcement by the FMC. The Report noted that removal of tariff-filing requirements would encourage greater competition in rates and services offered by ocean carriers.¹⁰⁴

¹⁰¹ FMC Report, p. 486 and p. 575. The argument that tariff filing reduces the FMC's monitoring costs, while obviously true, provides no compelling basis for the regulation.

¹⁰² See Section VII(A) for further discussion of this point.

¹⁰³ For instance, the public posting of prices encourages price-leadership behavior, where certain firms announce their price early in order to encourage other firms to raise their prices. When the prices of all firms are simultaneously revealed to the market and are subject to frequent revision, economic theory has shown that firms compete more aggressively than if prices are revealed sequentially. See Coate (1985) and Tirole (1988), pp. 330-331.

Consider a situation where prices are not observed until they are simultaneously revealed to customers. Typically, firms would be expected to compete aggressively to secure an adequate customer base. Now let some firms post their prices publicly, where those prices are designated to remain effective for a specified time period. Other firms could let these firms act as price leaders prior to establishing their own prices. In response, the price leaders could set a high price which would signal to their rivals that they could raise their prices and still obtain an adequate market share.

Thus, public notification could allow the conferences (or independents) to act as price leaders. Further, since prices become effective 30 days after filing, they can be used as a "trial balloon" to test rivals reactions. When these reactions are sufficiently accommodative, the prices would be allowed to stand.

¹⁰⁴ FMC Report, p. 503.

Some proponents of tariff filing claim that the elimination of filing requirements would impede shippers from collecting accurate information on transport rates.¹⁰⁵ Costs would be incurred in collecting information, and inefficiencies would arise. While it seems clear that the dissemination of accurate rate information can help markets operate efficiently, it is less clear that the FMC is needed to ensure that dissemination. In the ocean shipping industry, market mechanisms currently exist which provide shippers and carriers accurate rate information. For example, shippers can obtain rate information from freight forwarders and NVOCCs. If mandatory tariff filing were abolished, we would expect these, and other, mechanisms to respond by providing the information demanded by industry participants. The FMC Report does not show clearly that this result would not emerge.

Profit-maximizing carriers have incentives to provide shippers with easy access to information concerning their prices, and shippers have incentives to spread this information to other market participants. If a carrier offers a price lower than its competition, it would try to enlarge its customer base by disseminating information on price comparisons. In trying to obtain the lowest price possible, shippers might often inform carriers of price offers made by rivals. Given the current industry contracting structure, which includes clauses that release shippers from the contract in the presence of low-cost alternatives, shippers have impetus to collect and spread considerable price information.¹⁰⁶

¹⁰⁵ FMC Report, p. 489.

¹⁰⁶ Such contract clauses, known as "Crazy Eddie" clauses, may also reduce the incentives of individual carriers to offer price reductions.

Moreover, shippers would probably not have to consult a variety of sources to obtain rate information if mandatory tariff filing were eliminated.¹⁰⁷ Currently, shippers can use freight forwarders and NVOCCs to obtain transport services and transport rates; the latter have every incentive to collect rate information and find the low-cost providers of services.¹⁰⁸ The elimination of tariff-filing requirements could be expected to enhance incentives to collect and distribute price information.

Finally, the tariff-filing requirements make it more difficult for carriers and conferences to adjust to changing supply and demand conditions.¹⁰⁹ The requirement of public notification of prices impedes the ability of firms to respond efficiently to these changes. For instance, in the event of a sudden

¹⁰⁷ This statement may appear inconsistent with the FMC's finding that a majority of shippers surveyed support continued tariff filing and enforcement by the FMC. (FMC Report, pp. 532, 534) However, we interpret that result to indicate that shippers prefer more information to less and that shippers want to obtain the lowest shipping rate possible, not that they believe that those outcomes could not be provided by an unregulated market. We also note that surveys of shippers reveal that they strongly endorse independent action and would prefer to see it extended to service contracts. (FMC Report, pp. 684, 648) Those responses appear to indicate that shippers prefer the freedom to obtain price information from individual carriers.

¹⁰⁸ When regulated by the Civil Aeronautics Board, the airline industry had a centralized structure for providing rate information. Subsequent to "deregulation", rate information for most carriers is available from any travel agent. Freight forwarders, which provide a service similar to travel agents, would have equal incentive to collect and provide rate information.

¹⁰⁹ This difficulty is also noted in the House Committee on the Judiciary Report on H.R. 1878 (see FMC Report, p. 503). Moreover, relative to other industries, ocean carriers have considerable incentives to adjust price to changing economic conditions. Slack demand cannot be alleviated through inventory accumulation as in manufacturing industries. Once capacity is established, an ocean carrier becomes concerned with finding as many customers as possible to occupy its cargo space. Thus, there are strong incentives to make price adjustments and to provide information to customers concerning those adjustments.

market downturn, conferences would have to meet in order to revise prices and then notify the FMC before their rates became effective. In the meantime, conference profits would suffer.¹¹⁰ If firms were relieved of the tariff notification requirement, they could change their prices more rapidly while informing prospective customers of any changes. The prospect of lower adjustment costs might also encourage entry into the ocean shipping industry, which would result in even lower prices in the market for shipping services. It would appear that requiring tariff notification imposes costs without providing benefits that would not be provided through private market incentives.¹¹¹

X. Antitrust Immunity for Ports and Marine Terminals

The FMC's report discusses the need for antitrust immunity at some length.¹¹² However, the report does not reach a definite conclusion concerning the need for antitrust immunity for ports and terminals. Rather the report notes:

No clear and consistent economic conclusion can be reached as to the merits of encouraging collective ratesetting by granting antitrust immunity to MTOs. . . But even if the question about an economic need for antitrust immunity for public port authorities and private terminal operators were answered in the negative, this would not necessarily settle the fundamental policy issue. The question of whether to retain the current provisions dealing with marine

¹¹⁰ An individual conference member would, of course, be free to file an independent-action tariff, which would take effect in ten days at the most.

¹¹¹ Because tariff filing is currently required pursuant to statute, only an act of Congress (and not rulemaking by the FMC) could eliminate that requirement.

¹¹² FMC Report, pp. 433-482.

terminal operators, or abridge them to cover only public port authorities, or remove them altogether, involves a policy decision that balances the full array of regulatory concerns, including economic concerns, antitrust policy, state vs. federal regulatory responsibilities, and established industry practices.¹¹³

This statement is based largely on an examination of (1) neoclassical and Austrian economics views of antitrust regulation regarding market practices among competitors (pp. 472-473); (2) answers to surveys of the industry participants including public port authorities who control all major US ports, private marine terminal operators (MTOs) who provide the port services, carriers, and freight forwarders and shippers (pp. 465-467); (3) a description of the current port and marine terminal system and of competition in that system between ports and within a port facility (pp. 447-452); and (4) the record compiled in the 1983 FMC review of this issue.¹¹⁴

In the past, the FTC staff commented at some length on the need for antitrust immunity for ports and marine terminals.¹¹⁵ The staff considered

¹¹³ FMC Report, p. 479.

¹¹⁴ Notice of Inquiry and "Inquiry and Intent to Review Regulation of Ports and Marine Terminal Operators," *Federal Register*, Vol. 48, No. 179, September 14, 1983, 41199-41202. Also see Report of the Inquiry Officer, Part II, FMC Docket 83-38, January 23, 1985 which summarizes the views of the various industry participants with emphasis on the views of port authority officials and FTC staff representatives.

¹¹⁵ In response to the FMC's Notice of Inquiry, "Inquiry and Intent to Review Regulation of Ports and Marine Terminal Operators," *Federal Register*, Vol. 48, No. 179, September 14, 1983, 41199-41202, the FTC staff filed initial and supplemental comments in December 1983 and on May 14, 1984, respectively. In addition to these analyses, the Commission's views concerning competition in the maritime industry were expressed in the Statement by James C. Miller III, Chairman, on H.R. 1878, the Shipping Act of 1983, to the Subcommittee on Monopolies and Commercial Law of the House Committee on the Judiciary, May 18, 1983; Statement of the FTC on S. 47, presented to the Senate Judiciary Committee by Thomas Campbell, Director, Bureau of Competition, February 17, 1983; and Statement of Thomas Campbell and Robert Tollison on H.R. 4374, presented to the House Judiciary Committee, Subcommittee on Monopolies and Commercial Law, May 6, 1982.

several rationales for exempting marine terminal agreements from the antitrust laws. These rationales most often fell into one of two categories: cost minimization rationales, or profit maximization rationales. Regarding costs, various parties argued that: (1) antitrust immunity is needed to insure that ports and marine terminals avoid duplicative and excess capacity; (2) antitrust immunity is needed to allow terminal operators to enter into long-term contracts with carriers; and (3) immunity is needed to insure efficient (e.g., cost-reducing) information exchanges among ports. Regarding profitability, various parties argued that: (4) price fixing is necessary to maintain essential publicly-funded port facilities, which otherwise would be unprofitable as a result of excessive competition; and (5) ports and marine terminal operators need to act collectively to offset the monopsony power of carriers.

The FTC staff's comments have maintained that none of these concerns warranted the grant of antitrust immunity. Indeed, antitrust immunity could actually exacerbate the industry's excess capacity and reduce the incentive to use efficient contracts. In addition, many of the concerns appear to be based on a misapprehension of the current enforcement of the antitrust laws. Regardless of how such laws were enforced in the past, the FTC, the Department of Justice, and the Courts pay significant attention to the potential efficiencies involved in long-term contracts, information exchanges, and other activities that might be of some antitrust concern. While naked price fixing among competitors is clearly (and correctly) condemned automatically by antitrust agencies and the Courts, industry practices of the type most often argued to be necessary for efficient terminal and port

functioning are subjected to analysis that takes into account their potential to enhance efficiency.

A. The Basic Rationale for the Antitrust Laws

The antitrust statutes are intended to protect and promote competition. Prices generated through the competitive process provide market signals vital to obtaining the amount of each good that a society desires to have produced. In a well-functioning competitive market each type of good or service will be produced up to the point where the cost of producing more of it just equals the additional value consumers place on it. Any additional production would entail a cost greater than its value. Any less production would diminish welfare by denying some consumers access to a good for which they are willing to pay at least as much as its cost.

Immunity from antitrust gives competing firms license to avoid competition, by collectively setting prices and restricting output. If they are successful, prices rise, less of the good or service is produced, and resources that should have gone into producing that good are used instead to produce other goods of lower value to consumers. Consumers and society are worse off as a result.

A lack of competition may also lead to productive inefficiency, because firms may not be forced to produce as efficiently as they would under competition.¹¹⁶ Productive inefficiency can also arise when the firms agree not to compete on price, but fail to reach agreements limiting other dimensions of competition.¹¹⁷

¹¹⁶ Bork (1978, pp. 90-115); Scherer (1980, pp. 13-20, 459-74); Posner (1976) and Areeda and Turner (1978).

¹¹⁷ See Stigler (1968).

B. The Rationales For Antitrust Immunity Are Unconvincing

As is often the case in public policy debates there is no definitive empirical evidence that would allow one to decide whether antitrust immunity for ports and marine terminals has a positive net value.¹¹⁸ Thus, we (as is the FMC) are left to examine characteristics of the industry, theoretical arguments, and qualitative evidence from the parties involved. Because we presented our comments on the rationales for antitrust immunity previously,¹¹⁹ they will only be briefly summarized here.

1. Immunity Will Protect Ports From Losses Due to Excess Capacity

A capital redundancy problem had arisen by 1983 in the port industry in part because investment decisions had not been made wholly on the basis of projected economic viability.¹²⁰ Now, as ports are moving into an era in which they will need to operate increasingly as commercial enterprises, antitrust immunity for collective planning is urged as a means of avoiding redundant and wasteful investment in the future.

Rather than promoting optimal investment, antitrust immunity is likely to perpetuate the problem by facilitating the continued substitution of nonprice forms of competition for price competition. Experience in other industries such as regulated airlines and railroads has shown that one effect of continuation of antitrust immunity with attendant efforts to set prices

¹¹⁸ Insufficient data exist to allow an analysis that could reach a "bottom line" on the effects of antitrust immunity. Since antitrust immunity existed for ports prior to the 1984 Act, we cannot examine the effects of a change in regime on the prices, quantities, and quality of port services (and the determinants of those values) after a major change in antitrust immunity.

¹¹⁹ See note 115 above.

¹²⁰ Marcus (1976, pp. 6-20) and Wilder and Pender (1979, pp. 169-181).

collectively will likely be excessive nonprice competition, including unnecessary and costly investment.¹²¹

If marine terminal operators are able to collude effectively on price, one would expect the members of a terminal conference agreement would seek to attract customers in other ways. The increased profits that would accompany the effective cartel might cause an operator to engage in excessive investment in new equipment and facilities in order to reduce the amount of time a ship has to spend in port.

With supracompetitive prices brought about by an agreement not to engage in price competition, investment in time-saving equipment may be carried on to a point where the cost of the last equipment added is greater than the value of the time saved by its installation. Ship owners would prefer to spend a little more time in port, and pay a lower price for port services. The presence of excessive service competition results in a situation of chronic excess capacity.

Periods during which capacity remains idle are inevitable in any industry that features uncertain demand. The situation, however, will likely be exacerbated by allowing competitors to collude. Excessive nonprice competition will waste resources and cause total industry costs to be above those that are consistent with a competitive outcome.

2. Antitrust Immunity Is Needed To Allow Efficiency-enhancing Contracting

Some industry members apparently fear that elimination of antitrust immunity would deter long-term exclusive contracts between marine terminal operators (MTOs) and carriers. Such is not the case. Long-term contracts

¹²¹ See Douglas and Miller (1974), Hilton (1966), and for maritime industries, Jansson (1984).

are often an efficient means of achieving optimal levels of cooperation between firms at different stages of production. The antitrust laws recognize those effects and generally treat contracts under a "rule of reason" analysis. Only if the contracts can be shown to harm consumers and reduce welfare will the contracts be challenged. While one can conceive of such situations,¹²² the antitrust laws would not bar the vast majority of potential contracts between carriers and MTOs or shippers and MTOs.

**3. Antitrust Immunity is Needed to Allow
Efficient Exchange of Knowledge, Experience,
and Rate Data**

A third justification for antitrust immunity for rate discussions among ports is ". . . the need to exchange shared knowledge and experience with respect to terminal management, generally, and ratemaking, in particular."¹²³

Several industry members have noted that the exchange of information such as present costs, current prices, and future demand between ports and marine terminal operators, was beneficial in view of the swiftly evolving nature of the shipping industry. They believed that the antitrust laws would prevent all such information exchanges.

Many types of information exchanges, however, have been upheld by the antitrust courts. The decisions have recognized that the exchange of information may serve useful purposes. As a result, the courts have not

¹²² Long-term contracts could cause competitive problems if they facilitate horizontal market power at one stage of production. An exclusive contract between a carrier and a terminal is unlikely to facilitate market power if the terminal competes with other terminals in the same port and terminals in other ports. In these and other circumstances in which an exclusive contract does not allow the exercise of any market power nor reduce consumer welfare, the antitrust laws would not bar the arrangement.

¹²³ Initial Decision of Seymour Glanzer, ALJ, FMC Docket No. 82-34, *Agreement No. T-3856*, served August 29, 1983, p. 17.

applied a *per se* analysis even to the exchange of the most competitively sensitive data, current price information. The Supreme Court has stated:

The exchange of price data and other information among competitors does not invariably have anticompetitive effects; indeed such practices can in certain circumstances increase economic efficiency and render markets more, rather than less, competitive. For this reason, we have held that such exchanges of information do not constitute a *per se* violation of the Sherman Act.

United States v. United States Gypsum Co., 438 U.S. 422, 441 n. 16 (1978).

The Supreme Court has ratified this general approach in its more recent *Broadcast Music* and *NCAA* decisions which both placed emphasis on the potential efficiencies of business practices that years earlier would have been treated harshly by antitrust tribunals.¹²⁴ Under current enforcement, the antitrust risk of an information exchange among ports or marine terminal operators would depend upon the magnitude of the likely efficiencies, the nature of the information exchanged, and the vigor of competition in the market.¹²⁵

Even where the exchange of current ratemaking information among competitors is likely to violate the antitrust laws,¹²⁶ it is not obvious that

¹²⁴ See Broadcast Music, Inc. v. Columbia Broadcasting Sys., Inc., 441 U.S. 1 (1979) and NCAA v. Board of Regents of the University of Oklahoma 468 U.S. 85 (1984).

¹²⁵ This does not mean that all information exchanges would be considered benign under the antitrust laws, but that they would not be considered *per se* illegal. A direct exchange among competitors of recent transaction prices would pose antitrust concerns, since such information exchanges can facilitate price fixing. An information exchange is more likely to violate the antitrust laws in an industry whose structure and past conduct suggest a significant risk of price fixing or other collusion, than in an industry where effective collusion seems unlikely.

¹²⁶ Even leading critics of the traditional enforcement of the antitrust laws agree that blatant cartel behavior, which harms consumers without redeeming efficiency justifications, should be illegal. See, e.g., R. Posner

such exchanges would be essential for the efficient operation of ports. There are certain principles for port pricing, which, if adopted and applied by every port acting independently, would lead to an efficient allocation of ships and cargo within the port industry as a whole. This pricing system, which takes into account the marginal costs of producing port services and the marginal delay costs imposed on other ships by the entrance of each additional ship, would be the natural result of profit-maximizing port behavior in a competitive environment.¹²⁷

Observation of port pricing systems indicates that some application of these principles is occurring. Preferential berth arrangements, for example, extract additional rents from those who would impose additional delay costs on others by seeking priority assignments. Variable contract rights to the use of port facilities with differing degrees of priority and exclusivity have become more common. These arrangements encourage full use of a port's facilities.¹²⁸

Ports have also instituted different types of contractual arrangements for large and small users of port facilities. Oakland, for example, reportedly profited by offering large users preferential lease agreements for either exclusive or nonexclusive use of berths, yard areas and cranes. These agreements guarantee Oakland a minimum annual revenue regardless of throughput.¹²⁹ Smaller users are offered long term use agreements for

(1976, pp. 39-40) ("The elimination of the formal cartel . . . is an impressive, and remains the major, achievement of American antitrust law").

¹²⁷ See Bobrovitch (1982) and Heggie (1974).

¹²⁸ See Bennathan and Wishart (1983), and "Ports in the Eastern US Gulf Reassess Container Strategies," *Containerisation International*, December 1986, p. 70.

¹²⁹ *Containerisation International*, April 1983, pp. 58-59.

common user terminals, and the cost reductions from greater stability of demand and fuller utilization of facilities are returned to the carriers through reduced dockage and wharfage fees plus a discount for volume. In these ways, ports and marine terminals are acting independently to set rates reflecting their own technological conditions and service supply capabilities.¹³⁰

4. Antitrust Immunity Is Needed to Insure The Profitable Survival of Existing Public Ports

A concern of those who advocate antitrust immunity for ports is that, due to scale economies in port operation, competition among ports could cause losses for smaller ports.¹³¹ Inefficient port facilities might be forced to close. From a resource allocation basis, we would view this result as desirable. The resources released by exit would be more effectively utilized in other pursuits.

This justification for granting antitrust immunity to ports appears to envision additional ports remaining in operation because higher prices result from joint setting of rates. The result would be not only excessively high prices, but also excessive numbers of inefficiently small ports with the result that each port cannot achieve the lower costs available at high volume. This situation of inefficient high-cost production of port services is worse from an economic perspective than that which would result under

¹³⁰ For a discussion of the differing strategies taken by Gulf Coast ports, see "Ports in the Eastern US Gulf Reassess Container Strategies," *Containerisation International*, December 1986, p. 70.

¹³¹ Economies of scale must be distinguished from lower costs which could arise at identical scales of operation. Some ports, for example, may be situated in areas with lower land costs. Assuming they do not face offsetting higher costs in other areas, such ports will tend to expand at a greater rate than ports with high land costs, but their growth would not be due to economies of scale.

competition. Competition would tend to ensure that services were provided efficiently.¹³²

Allowing higher than competitive prices to maintain excess capacity in an industry could only be justified if there were some significant external benefit from excess capacity that was not taken into account by port customers in their decisions. Such externalities may exist in some industries, but it appears unlikely that such is the case here. First, other industries equally "essential" to U.S. commerce and defense (e.g., steel, chemicals, microelectronics) have not been granted the right to fix prices by Congress. Second, while failure of certain ports would cause losses to taxpayer-investors in areas where those ports are located, we cannot avoid losses simply by allowing supracompetitive pricing. The "losses" are only transferred to consumers generally as they pay higher product prices to subsidize continued operation of the inefficient ports.¹³³

¹³² It may also be the case that containerization technology has reduced the minimum efficient size of port and terminal facilities. The need for more exact scheduling for optimal deployment of new capital-intensive containerships and the actions taken to accomplish it are exemplified by APL's intricate plans for the scheduling of calls by its new C-9 vessels at West Coast ports. To accomplish this, it has introduced chassis-mounted terminal operations, and new ship-to-shore cranes and in-terminal equipment and is making more use of proprietary and exclusive facilities. See *Containerisation International*, July 1983, pp. 57-61. In addition, space availability at current ports may also limit their growth.

¹³³ The FMC Report notes that "today all major U.S. ports are controlled by public port authorities, 'instrumentalities of state or local governments established by enactments or grants of authority by the state legislature.'" (FMC Report, p. 471, quoting statement from Rexford B. Sherman, American Association of Port Authorities.) Certain activities of port authorities might be entitled to immunity from suits under the Federal antitrust laws, even if the antitrust immunity provisions in the Shipping Act of 1984 were repealed. Restraints on competition are insulated from antitrust attack if they constitute actions of the state itself. See *Hoover v. Ronwin*, 466 U.S. 558, 579-80 (1984); *Parker v. Brown*, 317 U.S. 341, 351 (1943).

A related argument is that in the absence of price-fixing, significant cycles in demand might cause prices to fluctuate "excessively." As a result, consumers and producers could gain from stabilization of prices at the "average" price.¹³⁴ This argument could be true if the industry was also characterized by high sunk costs which made capacity adjustments difficult. These conditions could create periods of significant excess capacity and considerable pressure to cut prices when demand falls. Prices might persist below the total cost of providing services because capacity cannot be readily adjusted.

Although the firms in the port and marine terminal industry may have significant sunk costs, it is less clear that they face significantly fluctuating demands. Even if they do, they may be able to write contracts that address the demand instability problems by transferring part of the risk to the buyers of terminal services. It is not clear that antitrust immunity would be needed to employ such contracts. An individual port authority could

Moreover, actions by private parties may also be immunized from the antitrust laws. Such immunity exists if the challenged activities are "clearly articulated and affirmatively expressed as state policy" and are "actively supervised by the State itself." California Retail Liquor Dealers Association v. Midcal Aluminum, Inc., 445 U.S. 97, 105 (1980). The active supervision standard requires that "state officials have and exercise power to review the particular anticompetitive acts of private parties and disapprove those that fail to accord with state policy." Patrick v. Burget, 108 S. Ct. 1658, 1663 (1988). Finally, actions by municipalities and probably state agencies are immune if they satisfy the clear state policy standard alone. Town of Hallie v. City of Eau Claire, 471 U.S. 34, 46, 46 n. 10 (1984).

We do not endorse an antitrust exemption for port authorities and MTOs. However, antitrust immunity for their activities that is derived from the state action doctrine may be more limited than the immunity a federal statutory exemption would grant.

¹³⁴ For a discussion of this argument concerning "cutthroat competition" and a generally negative appraisal of its applicability to post-World War II U.S. industry, see Scherer (1980, pp. 212-220).

contract with individual conferences or carriers to supply port services and facilities in return for the carriers or conferences absorbing some of the costs of capacity and agreeing to prices that do not vary widely over a cycle. Such contracts might give the proper incentives to all parties to reach a solution that does not involve welfare-reducing swings in profitability and investment.

5. Antitrust Immunity For Ports Is Needed To Counter The Market Power Of Carriers

Some industry participants argue that antitrust immunity is needed to allow ports to collude against conferences or carriers who will otherwise choose to dock at ports that charge low prices. While it is possible that the conferences of ocean carriers might try to exercise monopsony power against ports, success in such an endeavor would be unlikely. Rarely is a single ocean shipping line, joint service, or conference a port's principal actual or potential user. The numerous ocean shipping conferences and independent shipping lines which use a port would need to form a "supercartel" to deny the port a competitive return. This "supercartel" would be vulnerable to all the inherent sources of instability of cartels, and would require international cooperation to be successful.¹³⁵ In the absence of a single or dominant user or a "supercartel" of all users of port services, demand for port services by ocean shipping lines and conferences acting independently of each other would tend to bid port rates up to a competitive level.

¹³⁵ The fragility of cartels not backed by a strong authority such as a government is well known. See, for example, Scherer, (1980, n. 13, pp. 171-172). A supercartel such as that discussed above would not be legal unless approved by the FMC.

C. Conclusion

While we recognize that application of the antitrust laws to any industry increases the degree of uncertainty regarding the legality of business practices, we continue to believe that only the most exceptional circumstances should justify giving antitrust immunity to a particular industry. We do not view the port system as sufficiently different from other U.S. industries to warrant an antitrust exemption. As the National Commission for the Review of Antitrust Laws and Procedures aptly stated, such immunity is unwarranted unless "there is compelling evidence of the unworkability of competition or a clearly paramount social purpose."¹³⁶ In our view, no such "compelling evidence" or "paramount social purpose" has been established.¹³⁷ Absent those essential supports, we believe the case for antitrust immunity collapses.¹³⁸

¹³⁶ National Commission for the Review of Antitrust Laws and Procedures, *Report to the President and the Attorney General* 177 (1979).

¹³⁷ The information relied upon in the FMC Report falls well short of the level of "compelling evidence." It is no surprise that the survey results indicate that public port authorities and industry members who could benefit from an anticompetitive cartel strongly and consistently favor antitrust immunity. The fact that 40 to 45 percent of shippers (but only 8 percent of shipper associations) did not favor continued antitrust immunity is more telling. What is surprising is that over 90 percent of MTOs implied that the repeal of antitrust immunity would either lower prices or lead to greater operating efficiency due to additional competition.

¹³⁸ It appears that the FMC Report agrees that the evidence concerning the need for antitrust immunity is not very compelling (see FMC Report, pp. 436-37). Therefore, the conclusion one reaches on the issue depends mainly on the standard of proof one requires to maintain such immunity. The FMC Report makes no recommendation in the face of the evidence. We would tend to place a high standard on grants of immunity from the law.

XI. Conclusion

The 1984 Shipping Act strengthened the antitrust immunity afforded ocean common carriers while, at the same time, introducing some procompetitive aspects into the industry. Consequently, an appraisal of the effects of the Act requires a careful review of the evidence. Our review of the available evidence suggests that the procompetitive aspects of the 1984 Act, such as mandatory independent action and service contracts, may have provided real benefits to shippers by reducing shipping rates and providing better service. While we cannot affirmatively attribute the observed changes to the Act itself, we believe the results strongly suggest that enhanced competition in the ocean shipping industry can provide real economic benefits.

The FMC Report notes that the 1984 Act fostered a "heightened competitive process."¹³⁹ Still, the FMC Report is careful not to attribute any of the changes that have occurred in the industry to the Act's provisions that promote competition. Rather, the Report concludes that "any competitive impetus evoked by the Act may be indistinguishable from any other external influence and therefore difficult to quantify."¹⁴⁰ While the FMC's caution is understandable, given the difficulty of isolating empirically the effects of the Act from those of other factors, we believe the evidence justifies our greater optimism regarding the potential benefits of competitive forces.

In general, consumers benefit from the removal of impediments to competition. Several such impediments remain in the ocean shipping

¹³⁹ FMC Report, p. 265.

¹⁴⁰ FMC Report, p. 265.

industry, including tariff filing requirements, antitrust immunity for ports and marine terminal operators, and restrictions on conference members from negotiating service contracts directly with shippers. Our analysis questions whether these characteristics of the industry provide net social benefits. Thus, we recommend that Congress and the Advisory Commission seriously consider whether the continuation of these impediments is in the best interests of society as a whole.

Appendix A

Statistical Analysis of the Structure and Level of Shipping Rates

I. Introduction

To evaluate the effects of the 1984 Act, the FMC collected extensive data on conference shipping rates in various trades.¹⁴¹ Chapter 8 of the FMC Report presents and analyzes these data. In sum, the FMC Report concludes that the 1984 Act had no apparent effect on the structure or level of shipping rates.¹⁴²

In this appendix, the FTC staff use the FMC data to examine whether the rate structure and rate levels have changed over time. The analysis finds some statistical support that nominal rate levels were lower in 1987 and 1984 than they were in 1981, and that the rate structure was different in 1987 than it was in 1981. These findings, which are not consistent with those of the FMC, are based on a multivariate analysis of data supplied to us by the FMC after the release of its Report.¹⁴³

¹⁴¹ Appendix A to Chapter 8 of the FMC Report describes the FMC's data collection process.

¹⁴² FMC Report, pp. 155-156.

¹⁴³ The FMC staff provided us with the data used in the regression analysis presented on pages 202-203 of the FMC Report. These data contain the shipping rates of seventy-eight commodities for each of three years, 1981, 1984, and 1987. Some commodities are included more than once because they were shipped on different routes. The commodities were shipped on sixteen routes, eight inbound and eight outbound. The shipping rates for 1981 and 1984 are port-to-port rates because that was the only type of rate collected in those years. The shipping rates for 1987 are a weighted average of the various rates collected (port-to-port, service contracts, and intermodal.) Despite this change, the FMC Report believes that the data from various years can be compared because it has strived to "track the rate which moved the cargo." (FMC Report, p. 207) Our analysis implicitly adopts the FMC's position that the data are comparable across years.

II. The FMC Model

To assess whether the 1984 Act altered the structure of rates, the FMC Report specified the following multivariate regression model (hereafter the "FMC Model").¹⁴⁴

$$\begin{aligned} \text{Rate} = & a_0 + a_1 \text{ Stowage} + a_2 \text{ Distance} + a_3 \text{ Refrigerated} \\ & + a_4 \text{ Tonnage} + a_5 \text{ Value} + a_6 \text{ Direction} \end{aligned}$$

where,

Rate	=	the freight rate charged per long ton
Stowage	=	stowage factor (volume/weight)
Distance	=	the distance in nautical miles in the trade
Refrigerated	=	a dummy variable set equal to one when the cargo requires refrigeration and zero otherwise
Tonnage	=	the total volume of cargo of the commodity shipped
Value	=	the value per ton of the commodity
Direction	=	a dummy variable set equal to one for inbound cargo, and zero for outbound cargo
a_0, \dots, a_6	=	coefficients estimated by the model.

The FMC report estimates the regression model separately for the years 1981, 1984, and 1987. The FMC Report assesses the effect of the 1984 Act on the structure of rates by comparing the coefficient estimates from the 1981 analysis with those from the 1984 and 1987 analyses. Based on those

¹⁴⁴ FMC Report, p. 202. Like the FMC, we use the term "rate structure" to define the relationship between shipping rates and the six factors included in the FMC Model (the cargo's stowage factor, the distance of the route, whether the cargo requires refrigeration, the tonnage of the cargo shipped in the relevant route, the value of the cargo, and whether the trade is inbound or outbound.) In a statistical sense, the structure changes when the impact of these various factors on rates changes over time. For example, it could be the case that the distance of the route had a greater impact on rates in 1981 than in 1987.

comparisons, the Report concludes, "[T]he model indicates that the major difference in the rate structure in US liner trades before and after the 1984 Act was due to trade imbalances. The 1984 Act does not appear to have had a major effect on the structure of rates."¹⁴⁵ This conclusion is based on the observation that, except for the coefficients on the dummy variables indicating whether traffic was inbound or outbound¹⁴⁶, the coefficients appear relatively stable over time.¹⁴⁷

The FMC Report, however, does not perform statistical tests to examine whether the structure of rates has changed. Moreover, the assertion that the coefficients on variables, other than "Direction", are stable may not be entirely correct because the percentage change in the coefficient estimates from 1981 and 1987 are often substantial. For example, the coefficients on "Distance" and "Refrigeration" are almost 25% lower in 1987 compared to 1981. Whether these differences are statistically meaningful cannot be ascertained from the FMC model. In addition, the FMC Model cannot be used to statistically test whether rate levels changed significantly over time.

III. The FTC Model

The FTC staff have identified an alternative way to examine the structure and level of shipping rates. The FTC staff specification (hereafter

¹⁴⁵ FMC Report, p. 203.

¹⁴⁶ As described in the FMC report, "because of large trade imbalances, the direction the cargo moves has become an important factor determining the rate structure." FMC Report, p. 203. The FMC report also notes that prior to 1983 the U.S. ran a small trade imbalance but over the next four years the trade imbalance more than doubled. This change would affect transportation rates because of the development of additional excess capacity for outbound traffic.

¹⁴⁷ For a complete description of the results of the FMC analysis see FMC Report, pp. 202-203.

the "FTC Model") is a straightforward variant of the FMC model which, among other things, allows us to test formally (i.e., statistically) whether the structure of rates has changed over time.

The data analyzed by the FMC regressions include shipping rates for different commodities and different routes. Within each year the data include several observations for the same commodity (shipped on different routes) and several observations for the same route (shipping different commodities). Using this type of data raises two possible concerns.

First, statistical testing of coefficients estimated by the FMC model (or any similar regression model for that matter) is based on the assumption that the observations are statistically "independent."¹⁴⁸ This assumption may not hold for the FMC Model for two reasons: (i) the data incorporate several observations for the same commodity; and (ii) the data incorporate several observations along the same route. If shipping rates contain "commodity specific" and "route specific" effects, the observations in the regression would no longer be independent.¹⁴⁹

Second, and potentially more problematic, if these commodity and route specific effects are correlated with the included independent variables (such as stowage, distance, etc.), the estimated coefficients from the FMC equation

¹⁴⁸ The property of independence implies that what is not explained by the regression equation for one observation is independent of what is not explained for another observation. In other words, the error terms must be uncorrelated across observations.

¹⁴⁹ A "commodity specific" effect arises when shipping rates are based, in part, on the commodity being shipped. This effect is in addition to the effects of the other independent variables included in the analysis, such as the commodity's value and whether the commodity requires refrigeration. Similarly, a "route specific" effect arises when rates for commodities shipped along a given route have a common component not otherwise captured by the other variables included in the model, such as distance travelled and whether the route is inbound or outbound.

may be biased. In other words, the impact on shipping rates from these commodity and route specific effects may be inappropriately attributed to the included independent variables.

An alternative (but similar) version of the FMC model can be obtained by pooling all of the data for the three years into one dataset while still allowing the relationships between shipping rates and the independent variables to vary across the three years.¹⁵⁰ However, because the 1981, 1984 and 1987 data are based on the same routes and commodities, pooling the data is likely to enhance the interdependency problems discussed above. Thus, it becomes even more important to address directly the potential misspecification caused by commodity and route specific effects.

To account directly for the commodity and route specific effects we form dummy variables for each of the commodities and for each of the routes. This requires adding 49 commodity variables and 13 route variables.¹⁵¹

¹⁵⁰ This specification requires that 0-1 dummy variables be created for each year, and that these year dummy variables be interacted with the other included independent variables (such as stowage factor, distance, etc.)

¹⁵¹ As required by regression analysis, one commodity dummy variable is left out of the analysis (Beer). It was also necessary to omit 3 routes with at least one inbound and one outbound route excluded. Note that we do not include 78 commodity variables (the number of observations from each year) because multiple observations exist for some of the commodities.

Thus, the FTC Model is given by:

$$\begin{aligned} \text{Rate} = & a_0 + a_1 \text{ Stowage} + a_2 \text{ Distance} + a_3 \text{ Refrigerated} \\ & + a_4 \text{ Tonnage} + a_5 \text{ Value} + a_6 \text{ Direction} + a_7 \text{ Year84} \\ & + a_8 \text{ Year84*Stowage} + \dots + a_{13} \text{ Year84*Direction} \\ & + a_{14} \text{ Year87} + a_{15} \text{ Year87*Stowage} + \dots + a_{20} \text{ Year87*Direction} \\ & + \text{Route Dummy Variables} + \text{Commodity Dummy Variables} \end{aligned}$$

The following table compares the results of the FMC and FTC Models. The FTC results are presented in the right side of the table, the FMC results in the left side. Interpreting the results requires some care. Looking first at the top part of the table, the coefficients on the variables not interacted with either Year84 or Year87 indicate the relationship between the independent variable and shipping rates in 1981.¹⁵² Next, the coefficients on the variables that are interacted with Year84 indicate the change in the estimated coefficient between 1984 and 1981. Similarly, the coefficients on the variables that are interacted with Year87 indicate the change in the coefficient between 1987 and 1981.¹⁵³ The left side of the

¹⁵² For example, the FTC Model indicates that the effect of stowage factor on shipping rates was 0.529 in 1981, and that this effect was statistically significant.

¹⁵³ Continuing the example from the previous footnote, the FTC Model indicates that the coefficient on Year84*Stowage was 0.174 and the coefficient on Year87*Stowage was 0.067. These coefficients suggest that the relationship between stowage factor and shipping rates was 0.174 (0.067) higher in 1984 (1987) than it was in 1981. However, neither of the coefficients is statistically distinguishable from zero. Thus, one could conclude that stowage factor was positively related to shipping rates (due to the significant coefficient from 1981) but that the relationship did not change over time.

Summary of Results of Rate Structure Models

<u>Variable</u>	<u>FMC Model</u>		<u>FTC Model</u>	
	<u>Coeff</u>	<u>t-value</u>	<u>Coeff</u>	<u>t-value</u>
Constant	-18.400	-0.66	-145.624	-0.51
Stowage	1.150	5.78**	0.529	2.02**
Distance	0.016	4.21**	0.057	0.72
Refrigeration	161.610	3.80**	97.640	2.42**
Tonnage	-0.002	-2.36**	-0.002	-1.83*
Value	0.006	2.15**	-0.002	-0.81
Direction	0.023	0.29	28.298	1.21
Year84	-50.600	.	-27.889	-1.28
Year84*Stowage	0.150	.	0.174	1.14
Year84*Distance	-0.005	.	-0.005	-1.74*
Year84*Refrigeration	-19.880	.	-35.476	-1.17
Year84*Tonnage	-0.102	.	0.003	0.30
Year84*Value	0.004	.	0.002	1.13
Year84*Direction	34.747	.	20.879	1.48
Year87	-62.300	.	-37.537	-1.72*
Year87*Stowage	0.070	.	0.067	0.44
Year87*Distance	-0.004	.	-0.006	-2.19**
Year87*Refrigeration	-33.900	.	-44.013	-1.45
Year87*Tonnage	-0.075	.	0.001	1.79*
Year87*Value	0.002	.	0.002	1.13
Year87*Direction	51.340	.	45.827	3.24**
Aparts			36.269	1.3
Furniture			47.321	1.95*
Glassware			50.560	2.15**
Ironc			34.964	1.05
Offsetpp			59.672	1.41
Engines			112.340	4.69**
MWMachine			88.525	2.53**
Tires			56.324	1.50
Tobacco			39.181	1.47
Lumber			12.159	0.40
Veneers			40.457	1.09
SynRubber			14.804	0.42
Camera			102.514	2.51**
Wine			-6.275	-0.12
Tomatoes			-13.019	-0.25
Macaroni			-11.407	-0.22
Footware			314.061	6.31**
WastePaper			-14.638	-0.38
Rags			1.533	0.04
Hides			32.405	0.89
Cornseed			16.025	0.41
Peanuts			3.327	0.10
Fish			176.598	3.91**

**Summary of Results of Rate Structure Models
(continued)**

<u>Variable</u>	<u>FMC Model</u>		<u>FTC Model</u>	
	<u>Coeff</u>	<u>t-value</u>	<u>Coeff</u>	<u>t-value</u>
Lemons			86.601	1.67*
Hay			41.930	0.57
Cotton			14.278	0.31
Clay			16.001	0.46
Pottery			8.808	0.22
Radios			38.587	0.59
Motorcycles			73.717	1.28
Nuts and Bolts			-39.793	-0.84
TVReceiver			177.700	2.69**
Magazines			-34.341	-0.95
Frozen Beef			110.631	2.30**
Cheese			141.643	3.11**
Wool			18.405	0.56
Nickel			-18.750	-0.56
Casein			12.215	0.52
Beef			146.154	3.26**
Steelplates			-40.070	-1.32
Steeltubes			-48.876	-1.62
Zinc			-37.124	-1.23
Vegetable			-57.049	-1.17
Earth			-89.438	-2.27**
Textile			29.436	0.79
Autopts			21.248	0.76
Woodpulp			56.869	1.43
Autoparts			69.591	2.09**
Route No. 25			17.735	0.31
Route No. 5			-4.236	-0.09
Route No. 6			-51.348	-0.45
Route No. 7			-309.270	-0.63
Route No. 9			-19.926	-0.76
Route No. 2			-100.372	-0.21
Route No. 1			20.041	0.09
Route No. 26			49.516	0.43
Route No. 27			-139.186	-0.28
Route No. 22			-315.963	-0.66
Route No. 21			-143.163	-0.63

Adjusted R²

.8845

* = significant at 10% level

** = significant at 5% level

table presents the FMC results in a form so that they can easily be compared to the FTC results.¹⁵⁴

Before directly comparing the FMC results with the FTC results we examine the overall performance of the FTC model. The results indicate that the commodity and route specific dummy variables together add significantly to the explanatory power of the model.¹⁵⁵ Further analysis indicates that most of this increase in explanatory power comes from the commodity specific effects rather than the route-specific effects.¹⁵⁶ These

¹⁵⁴ The FMC numbers are derived from the results presented in Table 8-14 of the FMC Report, page 202. The coefficients for the variables that are not interacted with either Year84 or Year87 (the first seven variables listed in the table) simply replicate the regression coefficients from the FMC's 1981 regression. The coefficients on the variables interacted with Year84 (Year87) are the differences between the coefficient in the 1984 (1987) regression and the 1981 regression. For example, consider the variable "Year84*Distance." The coefficient in the FTC model for this variable indicates the change in the coefficient estimate from its 1981 value. To obtain the comparable estimate from the FMC analysis, we subtract the coefficient on "Distance" from the FMC's 1984 regression from the coefficient on "Distance" from the FMC's 1981 regression (the FMC regression results are contained in Table 8-14, page 202.) For the FMC model we do not provide t-values for the coefficients involving the Year84 and Year87 variables because that model does not allow for testing whether those coefficients are statistically significant.

¹⁵⁵ We have estimated the FTC model without the commodity and route specific dummy variables. A comparison between the adjusted R^2 of this model (.6389) with that in the table (.8845) indicates that the increase in the R^2 is significant. The adjusted R^2 s from the FMC model are .58 for 1981, .65 for 1984, and .69 for 1987. FMC Report, p. 202.

¹⁵⁶ Note that if an independent variable did not vary over time or within a given commodity, the FTC Model could not estimate the relationship between shipping rates and the independent variable because the latter would be collinear with the commodity-specific dummy variable. Fortunately, this does not apply to any of the independent variables. For example, while the distance of a given route does not vary over time, some commodities are shipped on different routes. Thus, the relationship between distance and shipping rates can be identified. Because many commodities in the dataset provide only one observation per year, a consequence of the FTC approach is that relatively few observations are available to identify the coefficients on the independent variables that do not vary over time (such as distance and

results suggest that, even after accounting for the factors included in the FMC analysis, there are still significant differences in prices across commodities.¹⁵⁷

Many of the same variables significantly affect rates in 1981 in both the FTC and FMC analysis. Both models detect positive relationships between shipping rates and stowage factor, and shipping rates and refrigeration; both models detect a negative relationship between rates and the tonnage of the commodity shipped. Still, the inclusion of route and commodity-specific dummy variables in the FTC Model affects the interpretation of some results. For example, the FMC regressions indicate that the value of the commodity is associated with higher prices in 1981 (the coefficient equals .006 and is statistically significant) while the FTC analysis indicates that these higher prices may be due to other differences among these commodities (the coefficient on value equals -.002 and is not statistically significant.) In addition, the FTC Model detects a smaller positive relationship between shipping rates and stowage factor than does the FMC Model. These differences suggest that regressions that exclude commodity and route specific effects may inappropriately attribute commodity and route specific effects to the included independent variables.

In contrast to the conclusions of the FMC report, the FTC analysis indicates that the structure of rates has changed significantly over the years

direction), leaving a large portion of the explanatory power of the model to be captured by the commodity-specific dummy variables.

¹⁵⁷ For example, the results indicate that for reasons independent of their value, their stowage factors, the distance of the routes, etc., shipping rates for beer and wine are lower than rates for engines and fish.

1981-1987.¹⁵⁸ The hypothesis that the structure of rates has remained the same over the years (with the exception of distance) can be formally tested by examining whether the coefficients on the variables interacted with Year87 and Year84 are statistically different from zero. The table indicates that many of the independent variables that are interacted with Year87 are significantly different from zero. For example, distance, tonnage, and direction all have significantly different effects on rates in 1987 compared with 1981.¹⁵⁹ In many cases, the estimates of the change in the coefficients from 1981 to 1987 derived from the FMC and FTC models are similar. Nevertheless, the FTC model indicates that, overall, these changes are statistically significant.

Unlike the FMC model, the FTC model can be used to examine whether rate levels have changed over time.¹⁶⁰ In general, the FTC model detects a downward trend in shipping rates even after accounting for the effects of

¹⁵⁸ An F-test for the inclusion of the 1984 and 1987 interaction terms indicates that these add significantly to the explanatory power of the model.

¹⁵⁹ We have also experimented with other formulations of the model. Because the variable "tonnage" is the volume of cargo of each commodity shipped it has the potential to be an endogenous variable. If this is the case, both the FTC and FMC model would be misspecified. Consequently, we have respecified the FTC model without the "tonnage" variable. The results of this analysis are very similar to those reported in the table. Moreover, we have reformulated the model so that the dependent variable is the price per container rather than the price per ton (we have similarly converted the independent variable "value" to be value per container). This analysis also provides results consistent with those reported in the table.

¹⁶⁰ The FMC Report did not appeal to statistical analysis to support its conclusion that the 1984 Act had no apparent effect on rates. Rather, the Report provides tables and graphs in Chapter 8 that depict the movement of shipping rates over time in various trades. In the text, the FMC Report provides reasonable rationales, such as exchange rate volatility, for the observed movements in rates and then concludes, "There is little evidence to suggest that the 1984 Act had a significant impact on rate levels." FMC Report, p. 194.

the other variables included in the model. More specifically, the results of the FTC model imply that: (1) On average, nominal shipping rates were significantly lower in 1984 and 1987 than they were in 1981, and 1987 rates were significantly lower than 1984 rates; (2) Nominal rates for outbound traffic were significantly lower in 1984 and 1987 than they were in 1981, and 1987 outbound rates were significantly lower than 1984 outbound rates; (3) Nominal rates for inbound traffic were lower, but not significantly lower, in 1987 and 1984 than they were in 1981, and 1987 inbound rates were lower (though not significantly lower) than 1984 inbound rates.

The following table reports the changes in rates from 1981 to 1984 and from 1981 to 1987 implied by the FTC Model for several different scenarios. The FTC model suggests that, on average, prices were significantly lower in 1984 and 1987 than they were in 1981. In particular, the table indicates that, on average, shipping rates in 1984 (1987) were approximately \$21 (\$33) lower than rates were in 1981. As average shipping rates in 1981 were \$203, these figures suggest that shipping rates were approximately 10% (16%) lower in 1984 (1987) than they were in 1981. While this finding does not establish that the 1984 Act caused the reduction in rates, neither is it consistent with the FMC's conclusion that there is little evidence that the 1984 Act had an effect on rate levels.

The table also shows that rates for outbound traffic were significantly lower in 1984 and 1987 than they were in 1981. For inbound traffic, however, the difference in freight rates between 1981 and 1987 is not statistically significant.¹⁶¹ This result provides some basis for the FMC's

¹⁶¹ In the model that analyzed the price per container instead of price per ton, rates for inbound traffic were significantly lower in 1987 compared to 1981.

assertion that the major influence on rates over time has been the large change in trade flows over the time period under consideration.

**Difference between 1984 (and 1987) Rates and 1981 Rates
(Figures represent change from 1981)**

<u>Scenario</u>	<u>1984</u>	<u>t-value</u>	<u>1987</u>	<u>t-value</u>
1) All Traffic	-21.3	3.07*	-32.8	4.61*
2) Inbound Traffic	- 9.9	1.07	-11.2	1.17
3) Outbound Traffic	-33.9	3.25*	-56.7	5.49*

* = significant at 5% level

Note: To predict rates for the respective years the independent variables must be set to a particular value. In the first line, all the independent variables are evaluated at their average values for the entire sample. In the second line (inbound traffic), we set Dir=1, and evaluated all other variables at their average for inbound traffic. In the third line (outbound traffic), we set Dir=0, and evaluated all other variables at their average for outbound traffic.

Bibliography

- Areeda, P. and Turner, D., *Antitrust Law: An Analysis of Antitrust Principles and their Application*, Boston: Little, Brown, 1978.
- Bennathan, E. and Walters, A. A., *The Economics of Ocean Freight Rates*, New York: Praeger, 1969.
- _____, and Wishart, Jenifer, "Private and Public Enterprise in the Ports of Developing Countries," presented to the Transportation Research Forum, November 1983.
- Bittlingmayer, George, "Decreasing Average Cost and Competition: A New Look at the Addyston Pipe Case," *Journal of Law and Economics*, October 1982, 25, 201-229.
- Bobrovitch, Dóv., "Decentralised Planning and Competition in a National Multi-Port System," *Journal of Transport Economics and Policy*, January 1982, 16, 31-42.
- Bork, Robert R., *The Antitrust Paradox: A Policy at War With Itself*, New York: Basic Books, 1978.
- Brock, William A. and Evans, David S., "Creamskimming," in David S. Evans, ed., *Breaking Up Bell: Essays on Industrial Organization and Regulation*, New York: North Holland, 1983.
- Bryan, I. A., "Regression Analysis of Ocean Liner Freight Rates on Some Canadian Export Routes," *Journal of Transport Economics and Policy*, May 1974, 8, 161-174.
- Cassell, Paul G., "Exemption of International Shipping Conferences from the American Antitrust Laws: An Economic Analysis," *New England Law Review*, 1984, 20, 1-30.
- Cassidy, Peter A., "The Cargo Liner Shipping Industry - Structure, Conduct, & Performance," Research Report No. 5, Business Research Center of the North Brisbane College of Advanced Education, March 1980.
- Coate, Malcolm P., "The Application of Structure-Conduct-Performance Theory to Oligopolistic Industries," Collusion Project Working Paper No. 2, Federal Trade Commission, 1985.
- Davies, J. E., "Pricing in the Liner Shipping Industry: A Survey of Conceptual Models," Report No. 1983/04E, Research Branch, Canadian Transport Commission, December 1983.
- Deakin, B. M. and Seward, T., *Shipping Conferences: A Study of Their Origins, Development and Economic Practices*, Cambridge: Cambridge University Press, 1973.

- Devanney, J. W. III, Livanos, V. M. and Stewart, R. J., "Conference Ratemaking and the West Coast of South America," *Journal of Transport Economics and Policy*, May 1975, 9, 154-177.
- Douglas, George W. and Miller III, James C., *Economic Regulation of Domestic Air Transport: Theory and Policy*, Washington: Brookings Institution, 1974.
- Evans, D., and Heckman, J. "A Test for Subadditivity of the Cost Function With an Application to the Bell System," *American Economic Review*, September 1984, 74, 615-23.
- Frankel, E.G., *Economic Impacts of Cargo Sharing, Vol. 3: Impact of Cargo Sharing on U.S. Liner Trade with Countries in the Far East and Southeast Asia*, report prepared for the Federal Maritime Commission, 1981.
- Heaver, Trevor D., "The Structure of Liner Conference Rates," *Journal of Industrial Economics*, July 1973, 21, 257-265.
- Heggie, Ian G., "Charging for Port Facilities," *Journal of Transport Economics and Policy*, January 1974, 8, 3-25.
- Hilton, George, "The Consistency of the Interstate Commerce Act," *Journal of Law and Economics*, January 1966, 9, 87-113.
- Jansson, Jan Owen, "Intra-Tariff Cross-Subsidization in Liner Shipping," *Journal of Transport Economics and Policy*, September 1974, 8, 294-311.
- _____, *Transport System Optimization and Pricing*, Chichester: John Wiley & Sons, 1984.
- _____, and Shneerson, D., "The Effect of Capacity Costs and Demand Elasticities on the Structure of Liner Freight Rates," *Logistics and Transportation Review*, January 1986, 22, 3-25.
- Kahn, A., *The Economics of Regulation: Principles and Institutions*, vol. II. New York: Wiley, 1971.
- Kyle, Reuben, "Review and Evaluation of Analyses on the Economic Impact of Rate and Service Cooperation by Ocean Liner Companies," Report No. DOT-TSC-OST-83-2, U.S. Department of Transportation, March 1984.
- Marcus, Henry S., Short, J., Kuypers, J. and Roberts, P., *Federal Port Policy in the United States, Chapter 2*, Cambridge: The MIT Press, 1976.
- McGee, John S., "Ocean Freight Rate Conferences and the American Merchant Marine," *The University of Chicago Law Review*, Spring 1960, 27, 191-314.
- Morrison, Steven A. and Winston, Clifford, *The Economics of Airline Deregulation*, Washington: Brookings, 1986.

- Olin, Gary L., "The Structure of Production in the U.S. Liner Shipping Industry," Ph.D. Dissertation, The Catholic University of America, 1982.
- Patinkin, D., "Multi-Plant Firms, Cartels, and Imperfect Competition," *Quarterly Journal of Economics*, February 1947, 61, 173-205.
- Posner, Richard A., *Antitrust Law: An Economic Perspective*, Chicago: University of Chicago Press, 1976.
- Scherer, F.M., *Industrial Market Structure and Economic Performance*, Chicago: Rand McNally College Publishing Company, 1980.
- _____, "On Maritime Shipping Conferences," Report to the President and the Attorney General of the National Commission for the Review of Antitrust Laws and Procedures, January 1979, 2, 231-247.
- Sharkey, William W., *The Theory of Natural Monopoly*, Cambridge: Cambridge University Press, 1982.
- Sjostrom, William, "Collusion in Ocean Shipping: A Test of Monopoly and Empty Core Models," *Journal of Political Economy*, October 1989, 97, 1160-1179.
- Spulber, Daniel F., *Regulation and Markets*, Cambridge: The MIT Press, 1989.
- Stigler, George J., "A Theory of Oligopoly," *Journal of Political Economy*, February 1964, 72, 44-61.
- _____, "Price and Non-price Competition," *Journal of Political Economy*, February 1968, 76, 149-154.
- _____, *The Theory of Price, 3rd Ed.*, New York: Macmillan, 1966.
- Telser, Lester G., "Cooperation, Competition, and Efficiency," *Journal of Law and Economics*, May 1985, 28, 271-295.
- Tirole, Jean, *The Theory of Industrial Organization*, Cambridge: The MIT Press, 1988.
- Wilder, Ronald P. and Pender, David R., "Economic Behaviour of Public Ports in the United States," *Journal of Transport Economics and Policy*, May 1979, 13, 169-181.
- Zerby, J. A. and Conlon, R. M. "An Analysis of Capacity Utilization in Liner Shipping," *Journal of Transport Economics and Policy*, January 1978, 12, 27-46.
- _____, "Joint Costs and Intra-Tariff Cross-Subsidies: The Case of Liner Shipping," *Journal of Industrial Economics*, June 1983, 31, 383-396.
- National Commission for the Review of Antitrust Laws and Procedures, *Report to the President and the Attorney General*, 1979.

National Magazine House, *Containerisation International*, London.

U.S. Department of Justice, *The Regulated Ocean Shipping Industry*,
Washington, 1977.