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Review and Evaluation of Analyses on the Economic Impact of Rate and Service Cooperation by Ocean Liner Companies

Reuben Kyle, Ph.D.
Dept. of Economics & Finance
Middle Tennessee State University
Murfreesboro TN 37132

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16. Abstract

The purpose of this report is to identify and discuss the literature regarding liner shipping conferences. Because the objective of this report is to facilitate access to the work of other writers, those writers were permitted to present their own views. At certain points, the author has included his own analysis of the literature and issues at hand.

The first section of the report examines the argument that liner shipping has unique characteristics that call for special public policy, while the second section examines the ability of liner conferences to inhibit competition. In the final section, the issue of conference efforts at "rationalization" of liner services is examined.

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PREFACE

The economics of the ocean liner industry and the question of what government policies should be pursued in regard to competition within this industry are still a matter of controversy in the U.S. and in other trading nations. The purpose of this report is to review available analyses - both theoretical and empirical - of the economic benefits which might accrue in ocean liner service as a result of governments permitting inter-firm cooperative arrangements (in particular, conferences) which in other circumstances might be expected to have unfavorable economic effects.

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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
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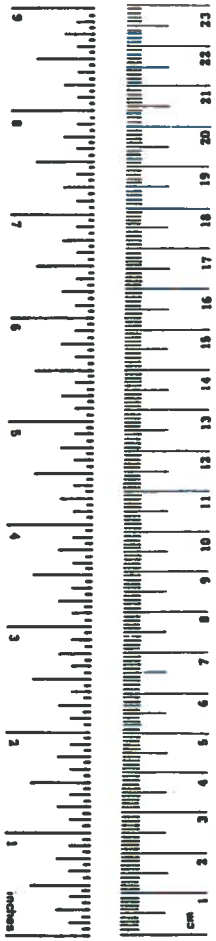

Approximate Conversions from Metric Measures

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		LENGTH		
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cm	centimeters	0.4	inches	in
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m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
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l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
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m^3	cubic meters	1.3	cubic yards	yd^3
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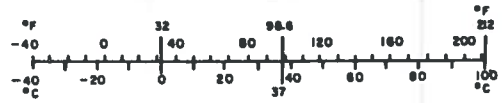

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Summary

The purpose of this review is to identify and discuss the literature pertaining to liner shipping conferences. Specifically, the literature examined concerns three questions about the nature of the liner industry and the operation of conferences. First, does the liner shipping industry have unique characteristics that, consequently, imply a need for special public policies? Second, to what extent do liner conferences inhibit competition in the market for liner shipping transportation? Third, what are the potential benefits of the rationalization of liner services?

Since the purpose of this review is to facilitate access to the work of other writers, those writers are permitted to present their own views to the extent possible. The review is organized to counterpose the arguments of different writers relating to each of the issues concerned. At the appropriate points, I have included my own analysis of the literature and issues discussed. Other than to summarize the findings in the literature, no efforts were made to provide new analysis of these issues or to draw inferences from the literature regarding policy conclusions.

No claim is offered that this review is exhaustive of the shipping literature. However, every effort was made to review the broadest possible cross-section of the shipping literature. The views represented here include those of industry spokesmen, academics, government officials, industry consultants, U.S. citizens, non-U.S. citizens, conference proponents, and conference critics.

The first section of the review examines the argument that liner shipping has unique characteristics that call for special public policy. Although the review found only one express claim that liner shipping may be a natural monopoly, many industry observers are tempted to make that claim on the basis of their view of the industry's cost structure. Others contend that the empirical evidence refutes the natural monopoly argument.

An even more widely held view is that liner shipping is subject to destructive competition because of the industry cost structure. Most critics point to the wide use of such arguments as special pleading. These observers note that while competition may be ruinous from the standpoint of the failed shipping company it is beneficial from the viewpoint of society to assure efficient utilization of scarce economic resources.

Another widely expressed view is that because liner shipping is an international industry it must receive special policy handling. Most writers, including the staff of the Department of Justice, argue that the international nature of liner shipping probably precludes unilateral U.S. deregulation, meaning an elimination of antitrust immunity. The same general agreement occurs in the literature regarding the national security role of liner shipping. However, in all cases acknowledgement of a need for special public policies toward shipping does <u>not</u> lead to agreement on the nature of such special policies.

The second section of the review examines the ability of liner conferences to inhibit competition. Not surprisingly, the literature includes sharply divergent views regarding the motives and objectives of liner conferences. Two particularly interesting works contend that even with the motives and objectives of profit maximizing, ocean liner conferences may make higher levels of shipping services available to society than would exist in a competitive regime.

A number of empirical studies indicate that the level of liner conference rates is explained primarily by the value per unit of commodities and the bulk of commodities, or stowage factor. These results reflect the use of price discrimination in the setting of liner rates. Such discriminatory pricing is found in virtually all transportation modes.

An examination of the limitations on conference market power indicates that independent operators are a factor in all U.S. liner trades except where precluded by government policy. In certain very attractive trades, for example, the U.S.-North Atlantic and U.S. Pacific-Far East routes, independents have occasionally caused conference agreements to break down. Moreover, conferences are not monolithic and internal tensions, particularly when reinforced by competition from independents, do lead to the classical cartel instability problem. Perhaps the most important limitation on conference behavior is technological change. Recent technological factors affecting liner shipping have been containerization, air freight and neo-bulk shipping.

The last section of the review examines the issue of conference efforts at rationalization of liner services. The term rationalization is applied in the literature to mean simply a coordination of sailing and port calls through the full array of practices of pooling agreements and control of access to liner trades that are associated with closed conferences. Most of the work reviewed noted that U.S. policy does not expressly prohibit rationalization, but industry observers representing a wide diversity of viewpoints argue that the U.S. policy of open conferences is the worst policy choice among the available policy alternatives. Much of the criticism of U.S. policy is directed at the very narrow view of the U.S. Department of Justice concerning the exemptions afforded liner conferences under the Shipping Act of 1916.

Regarding the potential benefits of rationalization, proponents of liner conferences argue that rationalization results in improved efficiency, lower costs, and stability in liner trades. Available empirical evidence provides very limited support for this position. Critics of liner conferences respond with the argument that conference efforts at rationalization actually provide incentives for excess capacity. The limited empirical evidence indicates that closed conferences, presumably using rationalization practices, are neither necessary nor sufficient for high vessel utilization, a requirement for low per unit shipping costs.

I. IS THE LINER SHIPPING INDUSTRY UNIQUE?

The debate over public policies regarding the liner shipping industry has centered on the characteristics of the industry and its role in the U.S. economy. In particular, proponents of liner shipping conferences contend that certain structural characteristics of the industry make a policy relying on competition as a market regulator inappropriate. Moreover, industry advocates have argued that shipping plays such a vital role in the U.S. and world economy that it must be afforded special public policies. A number of such arguments are listed below.

I. A. The liner industry is a "natural monopoly".

One such argument is that the cost structure of liner shipping implies that the industry is a natural monopoly. There is, however, much confusion concerning the cost structure of the industry.

University of Wales maritime specialists Davies and Gardner /30, p. 4/ do contend that the liner industry is a natural monopoly.

> It is evident that many containerized trades are now natural monopolies in that the lowest operational costs possible are achievable not when firms openly compete but when a single decision making and planning unit manages the trade, as does the conference system, though this is not because of technological considerations but because of organizational dictates, as demonstrated in the acknowledged economies of rationalization. Nevertheless, despite such considerations the economies of scale as an entry barrier argument, is nevertheless (sic) false. /Emphasis added/.

The authors then proceed to offer evidence that entry into liner shipping has frequently occurred. Later in the paper, Davies and Gardner /26, pp. 13-18/ discuss a model of short-run and long-run costs in the industry.

Long-run average costs for a vessel are illustrated as declining over the entire range of output (capacity supplied per period). As more vessels are added to a fleet, new long-run average cost curves are added above the original curve. This unusual model would seem to imply that the least cost firm would operate a fleet consisting of one very large ship. For a "liner-shipping service" the authors illustrate /30, p. 17/ the long-run average cost (LRAC) curve for break bulk services as reflecting some economies of scale initially but then remaining constant over all subsequent levels of service offered. In the case of container services, the LRAC declines over the entire range of output. The authors conclude /30, p. 18/ that: "... the liner industry will tend toward natural monopoly, especially in the containerized trades where the cost savings from rationalization are greatest." /Emphasis in original/.

In an earlier paper, Davies /27, p. 99/ expressed some of these same views:

> ...it is sufficient to conclude that although scale economies as an entry barrier may be substantial in the container trades, they are not likely to have such importance in the break-bulk trades.

Throughout this paper he continues to argue that despite possible scale economies entry barriers are not high enough to preclude entry. In fact he concludes that conference efforts to deter entry represent evidence of the absence of high barriers to entry.

The rather obvious logical inconsistencies in both of Davies' papers reflect an apparent desire to show that centralized, i.e., conference, management of liner operations is beneficial but that the benefit does not derive from strictly technological factors. If the latter were true then monopoly would clearly occur more often in the industry than is the case.

A very similar line of argument is offered by FMC economist Ellsworth. He starts /37, p. 503/ from the opposite conclusion to that of Davies and Gardner. "The ocean liner industry does not qualify as a natural monopoly -- such as a public utility -- because economies of scale are not great enough to lead to a monopoly solution." Ellsworth then discusses natural monopoly in which (long-run) average costs decline over the entire range of output. In the case of liner shipping he observes /37, p. 504/ that, "capital costs and, therefore, fixed costs", are high. He illustrates short-run average costs as declining over the entire range of output "because of the nature of the common carrier service these operators offer." Ellsworth does not discuss the relationship of (declining) short-run averge costs and long-run average costs. Needless to say the reader is left in confusion.[1]

Deakin and Seward /31, pp. 90-94/ attempt to address this seeming dilemma regarding the cost structure of liner shipping. They contend that unit costs of a liner vessel decline continuously over a range of output until its capacity is reached whereupon unit costs increase at an infinite rate. In the long run, Deakin and Seward illustrate the expansion of a liner service as the addition (horizontally) of additional vessels with no associated economies of scale. They do consider the possibility of scale economies but apparently did not regard them as significant.

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[1] It is possible that some of Ellsworth's confusion derives from a model of liner economics by Abrahamsson / 1/. Although not cited by Ellsworth, Abrahamsson illustrates these same type cost curves that are not consistent with mainstream economic definitions.

Convinced that liner shipping is unique, transportation specialists Sletmo and Williams /94/ tried a different approach to support this belief. They, too, discuss /94, p. 7/ natural monopoly and the cost structure of liner shipping. "Looking exclusively at cost structures, the obvious conclusion would be that shipping is not different, nor is transportation in general." /Emphasis in original/. Their discussion of the cost structure of liner shipping notes the high fixed costs, "a significant problem of common costs" deriving from many shippers' use of the same ship, and marginal costs falling below average total costs "for the same shipment." In apparent agreement with Ellsworth, Sletmo and Williams conclude /94, p. 10/: "The unique aspect of liner shipping compared with other forms of ocean transport, then, is a combination of special demand characteristics (the unit of demand being smaller than the unit of supply) and low short-run marginal costs." For average costs to always exceed marginal costs, average costs must decline over the entire range of output. The confusion persists.

All of the writers discussed above are clearly enticed by the natural monopoly issue. Most resist the argument directly but at the same time they contend that per unit costs decline over the entire range of liner service offered. The confusion here stems from treating the per unit costs of a single vessel on a single voyage as the appropriate measure of the cost of liner service. None of the cited works attempts to actually estimate liner costs. At best they refer to now outdated work by Ferguson et al. /41/ which is discussed below.

The contrary view -- that liner shipping is not a natural monopoly -- will be represented by five works. Frederick Scherer, a distinguished American industrial economist and former director of the Bureau of Economics at the Federal Trade Commission, discusses /89/ the argument offered by the UWIST

economists regarding natural monopoly in liner shipping and some limited empirical evidence. He urges /89, p. 235/ further examination of the matter and concludes that "the evidence currently available certainly does not support an inference that shipping is a natural monopoly."

A similar view was expressed by John S. McGee /79, p. 276/:

> One might have greater confidence that natural monopoly exists if each market continues to be served by one firm. This is obviously not the case in general cargo transportation unless it is legitimate to call a shipping conference a "firm." ... It seems likely that natural monopoly requires central management, not the usual loose cartel administration ... For the most part now conference secretariats do not schedule, plan, or control. It is difficult to see what it is that they do that could be construed as centralized management out of which great economies can arise. /Emphasis in original/.

The Justice Department's 1977 study of liner shipping /108, p. 228/ also concludes that the industry is not characterized by natural monopoly. The study cites with approval McGee and Devanney et al.

There are four studies which provide some empirical evidence regarding economies of scale and consequently natural monopoly in liner shipping. First, the now classic study by Ferguson et al. /41/ includes a theoretical and empirical analysis of shipping costs, albeit for the period before 1960. The author of this section of the book, Walter Oi /41, pp. 310-311/ wrote:

> Both theoretical considerations and the available empirical data refute the hypothesis that there are massive economies of scale in this industry. Indeed, the evidence indicates roughly constant returns over a substantial range of firm sizes, that is, costs per ton of capacity would be roughly equal for firms with fleets ranging in size from 10 to 40 ships. From about three to about 12 ships costs appear to be roughly constant in serving a single market.

Unfortunately, since Oi's work was completed, liner shipping has experienced a revolution brought about by containerization. Thus, his general conclusions may no longer hold and without question, his specific conclusions about fleet sizes would no longer be valid.

Updated empirical evidence is provided by the simulation of U.S./Latin American trade by Devanney et al. /32/. Here again the time period involved, the late 1960's, would imply that containerization was not a major factor in the trade. The study projected fleet sizes and costs for different vessel sizes and speeds on a hypothesized (Latin America) trade. The simulation projected that the minimum cost operation would require eight vessels, of a specified size and operating at specified speeds, to serve the trade. By comparison, the actual liner services on the route operated much smaller ships traveling much faster, in considerably larger numbers. The implication of the simulation is that i) minimum costs would not necessarily require one single firm and ii.) existing service is not efficient despite strong conference organization.

A third source of empirical evidence regarding the extent of economies of scale in liner shipping is a study done by E. G. Frankel, Inc. /46, pp. 58-98/. The study includes discussion of a model of the costs of liner operations and presents estimated cost data by ship and shipping line for actual services on U.S./Far East routes. Short-run cost curves are illustrated for average and marginal costs per TEU of annual capacity. The Frankel study does not attempt to derive long-run costs but the short-run curves, at least for trade route 29, suggest that for the level of service provided by existing competitors of between 200 and 350 thousand annual TEUs long-run per unit costs are constant.

The most sophisticated recent economic analysis is a Ph.D. dissertation by Maritime Administration economist Gary Olin /85a/. Olin hypothesized that

liner shipping firms are profit maximizing enterprises subject to competition in both input and output markets. He used econometric methods to estimate a translog profit function for a sample of 12 U.S. liner firms over the period 1974-1976. His statistical results do indicate economies of scale in liner operations. However, he concludes that the statistical results do not permit a finding that there are extensive economies of scale /85a, p. 65/.

In conclusion there is not much evidence to support the argument that liner shipping can be characterized as a natural monopoly. The empirical studies do indicate some economies of scale, although the extent of such economies is still in question. However, casual empiricism suggests that if important scale economies, deriving from either technological or "organizational" factors, did exist that there would be higher levels of market concentration evident in liner trades than currently exists. The author would conclude that the case for natural monopoly is not proven.

I. B. The liner industry is subject to "ruinous competition."

Even more widely represented than the natural monopoly argument is the view that liner shipping is an inherently unstable industry, subject to ruinous, cutthroat competition. This argument has been raised as a defense of liner conferences from the earliest days.

For a history of the British Royal Commission on Shipping Rings, established in 1907, and the Alexander Committee of the U.S. House of Representatives, established in 1913, see McGee /79, pp. 191-213/ and Marx /77, pp. 46-53/. The turn-of-the-century view of shipping and business in general is represented by J. G. B. Hutchins in a very scholarly history of U.S. shipping /61, p. 524/: "All of the evils of unregulated railway competition arose in the shipping industry, including rebating, discrimination, and

predatory competition." Even modern analysts view the period during which the first conferences were formed as being characterized by "inherent stability of the liner trades" /38, p. 158/.

The basis for this cutthroat competition, in the view of some analysts, derives from the fact that "both demand and supply functions in this industry tend to be rather inflexible" /77, p. 239/.

Inflexibility or commitment to a trade leaves operators vulnerable to "the incursions of rate-cutting competitors who have only the short-run profit motive as an objective" /2, p. 26/. More specifically, /124, p. 27/:

> The high capital-to-labor ratio, the inability to augment physical capital in the short run, and the fixed supply price prevent the usual market mechanism from achieving a stable equilibrium.

A number of analysts have explored the relationship between liner cost structure and pricing behavior in order to explain the tendency toward destructive competition. Sletmo and Williams /94, pp. 9-11/, as noted above, find that liner shipping is unique because, in part, marginal costs are below average total costs. As a consequence they believe that to impose "free competition" on this industry would result not simply in instability and cutthroat competition but "a greatly reduced offering of scheduled services." Ellsworth /37, pp. 504-508/ also maintains that high capital costs imply that average costs of liner operation fall over the entire range of output and thus marginal costs must be less than average costs. This cost structure precludes competition /37, p. 508/:

> Since variable or marginal costs account for only around 20 percent of total costs, marginal cost pricing must be destructive and ultimately results in a breakdown of the competitive solution. A carrier that is forced to cut rates to the level of variable costs is pricing his service well below the cost of providing the service and must ultimately go bankrupt.

Virtually identical analysis and conclusions are offered by Davies and Gardner /30, pp. 8-10/. They postulate falling short-run average costs over the entire range of output offered.

> This declining short run cost situation is ... of importance as it demonstrates that the theoretically desirable and perfectly competitive pricing policy of equating prices with marginal cost is not possible in liner shipping. This is necessarily the case because at any level of capacity utilization marginal costs will <u>always</u> be below average total costs and therefore the equation of MC with price can only be a recipe for bankruptcy. /Emphasis in original/.

The arguments concerning the inevitability of destructive competition in liner shipping have elicited considerable response. A particularly interesting response is that of British maritime economist S. G. Sturmey /98, pp. 191-196/.

> Almost every writer on the subject, myself included, has argued that the necessity for conferences arises from the structure of costs. "The need for a conference system arises from the economics of liner operations" /99, p. 373/.

***

> The mistake is simple. Once a ship has been put on berth, timed to depart at a particular hour, most of the costs of the scheduled voyage are fixed. The only variable cost is that of loading and discharging cargo... But the ordinary cargo liner has some flexibility of operation ... Once <u>any</u> flexibility is introduced, the marginal cost of an extra ton of cargo ceases to be simply the handling charges.

Sturmey proceeds to examine what he regards as a more valid analysis of costs and an examination of other defenses of liner conferences. He concludes /98, p. 196/ that despite the failure of the ruinous competition argument he cannot reject all protection of conference organization.

The DOJ study of 1977 /108, p. 29 and especially Appendix J/ presents the argument that the destructive competition case hinges entirely on the immobility of capital. If the overcapacity which initiates a rate war is reduced when rates fall then stability will be restored.

Bennathan and Walters /9, pp. 96-98/ reject the contention that overcapacity would not be eliminated in shipping. "There is neither a compelling theoretical reason nor any empirical evidence to support persistent over-estimation of demand for shipping" (p. 97). They point out that similar predictions of instability and excess capacity were made before the deregulation of the British trucking industry in the 1950s. "The belief that, in the absence of conferences, regular liner-type services would disappear is, I believe, discredited by the evidence both from similar industries (e.g., British Trucking) and from those routes where conference organization has broken down or does not exist (e.g., Bangkok-Singapore)" (p. 98).

F. M. Scherer /88, pp. 212-220; 89, pp. 235-238/ offers examples of a number of U.S. industries in which the destructive competition argument has been raised. He finds the argument unconvincing. Moreover, he contends that if the argument were valid and the logical conclusion, i.e. monopoly of destructive competition were realized, the worst case would be that prices would rise to the level set by liner conferences.

Still another line of argument regarding destructive competition is that it is beneficial. Roberts /87, pp. 40-41/ maintains that competition becomes destructive because of excess capacity and inefficiency. Thus, such competition is socially desirable because it results in "the destruction of waste." McGee /79, pp. 272-273/ makes the same point.

> Competition will always be "ruinous" to capital values when demand declines considerably, or costs rise. Indeed, that is its principal merit.

He acknowledges that competition could be ruinous if the public interest were injured. However, that result is only likely to occur in decreasing cost industries, which is to say natural monopolies, and he proceeds to reject that case in shipping.

Ironically, some analysts of liner shipping have argued that conferences, rather than eliminating destructive price competition, actually promote it. Baeseman et al. /3, pp. 30-31/ conclude that all liner conferences are susceptible to price cutting because they promote excess capacity themselves. DOJ analyst Elliot Seiden /62, p. 44/ cites a number of instances in which conferences have promoted rate cutting as a means of driving new entrants from their routes.

The argument that liner shipping is subject to ruinous competition has a long history and has been offered by many industry observers as a rationale for exempting the industry from antitrust prohibitions against cooperative price making. From the shipping company's perspective there is no doubt that the cost structure of the business makes adjustment to reduced demand difficult and painful. However, the issue hinges on whether liner shipping differs substantially from other industries with similar cost structures. This same argument has been applied to many other industries and typically economists, and policy makers, have been unconvinced that the public interest would be served by permitting collusion.

I. C. The liner industry has common carrier obligations or public utility status.

Still another argument for affording liner shipping special status is that the industry has common carrier obligations or that it has the characteristics of a public utility.

Sletmo and Williams /94/ develop this case very carefully. At the beginning of the book, they address the issue that liner shipping is a special case. In the course of this discussion /94, pp. 5-6/ they describe public utilities as industries designated for special public policy; one characteristic of such industries is "the predominance of fixed over variable costs as a consequence of their highly capital intensive nature." During a discussion of the nature of liner cargoes and freight rates, they observe /94, p. 56/ that "differential pricing is extensively used by public utilities..." Such pricing in the case of shipping increases vessel utilization and therefore is beneficial. Finally, they conclude /94, p. 71/:

> ...liner operations have many economic characteristics in common with "public utilities" such as power generation, telecommunications, and railroads. The similarity lies in the peculiar characteristics of production in these industries: no, or limited, ability to produce for inventory, the lumpiness or indivisibility of assets, resultant high fixed costs relative to variable costs, and the fact that individual demand on the seller presents itself in quantities that represent only a fraction of his "output" or capacity at a given time. /Emphasis in original/.

The Harbridge House simulation of U.S. liner trade /54, pp. IV-6, -7/ incorporates a scenario of increased liner cooperation, i.e., the formulation of effective cartels. The description of this environment includes a suggestion that the appropriate economic model would be that of a utility. The authors indicate that this model would be subject to the

qualifications that shipping is an international industry and that liner conferences are subject to "internal stresses and dynamics".

UWIST maritime specialists Evans and Davies /38, pp. 165-166/ link the common carrier obligation, without using the phrase, and utility status.

> Through the provision of long-term scheduled liner services, shippers are in effect provided with a public transport service upon which they can call at reasonably short notice ... For the shipowners, providing such services involves tying up large amounts of capital and incurring great expense ... The providers of liner service do not willingly reduce or cease operations as short-term cost saving measures, as they supply a long-term service ...
>
> Unlike other public services which are state run, the liner business is in the main a privately owned industry which means that the firms involved have to operate on commercial principles and in the long run, must of necessity cover their costs if they are to remain in business. /Emphasis in original/

With regard to the common carrier status of liner shipping, the 1977 DOJ study /108, pp. 216-220/ addresses the argument and finds it weak. An examination of a sample of conference agreements indicates that few impose any requirement for regularity of service on conference members. Thus the DOJ rejects the contention that liner shipping undertakes any common carrier obligation.

At the present time, the concepts of public utilities, public regulation, and public intervention in business are being vigorously debated by academics and public policy makers. The very least that might be concluded regarding the application of utility status to international shipping is that the idea is extremely fuzzy and, in any case, unnecessary.

I. D. Ocean shipping is an international industry.

A widely voiced argument for assigning special status to liner shipping is that the industry is international and cannot be subjected to unilateral regulation by one participant.

Sletmo and Williams /94, pp. 264-293/ devote most of a chapter to discussion of the conflict between U.S. shipping regulation and international policy. They protest /94, p. 266/ that other nations have developed their own policies toward liner conferences often in conflict with U.S. policy. "Yet, American regulatory agencies on more than one occasion have clearly demonstrated their determination to impose their own rules and regulations on the citizens of other countries." Following a discussion of other nations' shipping policies and the UNCTAD code, they conclude /94, p. 293/ that U.S. policy threatens world shipping.

> The United States now stands in splendid isolation warning the world of the dangers posed to world trade by strong conferences ... The danger ahead lies not with the alleged power of conferences, but in the very likely possibility of spreading unilateral government action throughout the world. If others follow the U.S. example, chaos will result and private enterprise in liner shipping risks extinction.

These same sentiments are expressed by many others. The Harbridge House study /54, p. IX-9/ concludes that "almost all other countries ... would no doubt welcome any steps taken to allow conferences ... to decide their own futures..." But policies to increase competition "would run headlong into objections from almost all of our major trading partners ... and could intensify existing shipping disputes ..." Mr. Raymond Waldmann of Harbridge House /62, p. 23/ contends: "Ocean shipping is inherently international and should not be compared with our domestic transport industries..." Mr. James

Payne, European shipping executive, complains /62, p. 71/ that "the effect of applying U.S. laws to extraterritorial conduct is that the economic policies of the U.S. are to that extent imposed upon business in other states ...." In a paper on U.S.-Brazil coffee trade, J. J. McDonnell /78, pp. 798-799/ argues that U.S. efforts to impose its policies unilaterally have been strongly resisted.

> The present procedure of unilateral action by each nation with an interest in the conference agreements seems destined to cause more impasses ... Perhaps the nature of shipping conference regulation is both too political and international in nature to be handled by any one government in any respect.

An even more interesting discussion is proffered by Ellsworth /37, pp. 511-515/. He makes the case that international shipping policies, including the subsidization of the industry, nationalization of fleets, government promotion of consortia, all make a competitive market shipping policy impossible. The result, he argues, would not be the survival of efficient, low cost operators. The subsidized supply of liner services is compounded by the restrictions on exit from the industry, another problem that confounds any market solution.

Even the U.S. Department of Justice /108, pp. 243-256/ recognizes the difficulty of applying antitrust laws to foreign carriers. The 1977 DOJ study recommended only pro-competitive modifications of the Shipping Act.

Other advocates of a more competitive liner industry take similar views of advocating modification of existing U.S. policy. In 1953, Daniel Marx /77, p. 300-301/ advocated permitting conference self-regulation. But, given the diversity of economic philosophies in the world, he recommended that the U.S., and all nations, retain some unilateral control "to prevent undue discrimination and other monopolistic abuses..." A Booz, Allen, and Hamilton

comparative analysis of U.S. international shipping and aviation policies /13, pp. 66-68/ points out that with respect to cooperative agreements among carriers and despite the constraints on international airline service, U.S. policy in that industry is more competitive "because it allows no exceptions to the flat prohibition against traffic allocation agreements..." Another study by Simat, Helliesen and Eichner /92, pp. 19-20/ makes the argument that the issue of comity has been exploited by injecting questions of sovereignty into international discussions and thus avoiding a discussion of appropriate shipping policy. "The conferences have used the comity issue to deflect attention from the really important questions. This should be avoided in the future."

Robert Larner /69, pp. 133-134/ concludes a discussion of U.S. policy with the following observation:

> The prospects for attaining a workably competitive market in the ocean shipping industry are not bright, regardless of the policy alternative chosen. The industry's structural conditions are not favorable, and its international character largely thwarts efforts to change structure or performance by direct governmental action, either regulatory or antitrust. A policy aimed at allowing market forces to work their full effects, however, seems more likely to lead to an acceptable outcome than a policy that asserts ocean carriers in controlling the forces of competition.

I. E. The liner industry is essential to the national defense.

The ultimate argument, that the liner shipping industry is deserving of special public policy, is that the industry is essential for national defense purposes. It is quite clear that the Congress of the United States has established this proposition as the law of the land. The preamble to the Shipping Act of 1916 /105/ identifies the law as:

> An Act to establish a United States Shipping Board for the purpose of encouraging, developing, and creating a naval auxiliary and naval reserve ..."

The Merchant Marine Act, 1936 /105/ declares, as a matter of policy:

> It is necessary for the national defense ... that the United States shall have a merchant marine...

Both of those statutes go on to legislate special public policies that foster the merchant marine and liner shipping in particular.

Since 1916 there have been many governmental reviews of U.S. shipping policy with respect to the liner industry. Virtually every one of those analyses has agreed with the proposition that some U.S. liner industry is necessary. A brief sampling of conclusions from such studies follows.

The Interagency Maritime Task Force of 1965 /116, p. 5/ observed, "... the merchant marine ... is a necessary element of national power ... and must be supported to the extent it is not self-sustaining." A 1981 General Accounting Office review of maritime subsidiaries /115, p. 1/ found that, "the merchant marine supports America's military services in peacetime as a major supply link in the defense network and as a transport for people and materials during a national emergency." A 1982 Office of Management and Budget review /113, p. 63/ admits:

> The seriousness of the risks that the merchant fleet may assist the nation to avoid are impossible to measure with accuracy, and willingness of assuming any national security risk is a question of political judgment.

The national security agreement in support of special policies, most often subsidy and import restriction, for particular industries also has a respectable intellectual foundation. Using mainstream economic analysis in a very respected academic journal, UCLA economist Earl A. Thompson /101/ provides two arguments favoring public subsidy of private industry in the interest of national security. First, he makes a case /101, pp. 4-6/ that increasing private capital may deter potential foreign aggressors. That is the existence of private capital -- industrial capacity including technological inputs -- increases the risk that aggression will fail, thus increments to private capacity changes the likelihood of failure. Second, he argues /101, pp. 7-17/ that private investors may undervalue the production of certain goods during peacetime. Private investors' decisions are based on expected private returns which are captured by investors. In wartime social benefits associated with the use of certain goods and services may exceed private benefits. Since these benefits are not included in the private investors' calculation, the level of investment in such industries would be less than some social optimal level. As a result, society's welfare is enhanced by providing peacetime subsidies to those industries.

Having established that support for the merchant marine by means of special public policies is i) the national policy and ii) intellectually respectable, it does not follow that there is universal agreement regarding the nature of such special policies. Each of the cited government studies of U.S. maritime policies recommended substantial, even radical, changes in policy from those legislated by the Shipping Act of 1916 and the Merchant

Marine Act of 1936. Moreover, much of the literature discussed in this review includes policy recommendations for changing U.S. shipping policy with respect to the liner industry. The literature cited offers many differing policy conclusions regarding liner shipping.

The first section of the review examined the plea that liner shipping has unique characteristics that call for special public policy. Although the review found only one express claim that liner shipping may be a natural monopoly, many industry observers are tempted to make that claim on the basis of their view of the industry's cost structure. Others contend that the empirical evidence refutes the natural monopoly argument. An even more widely held view is that liner shipping is subject to ruinous competition because of the industry cost structure. Most critics point to the wide use of such arguments as special pleading. These observers note that while competition may be ruinous from the standpoint of the failed shipping company, it is beneficial from the view of society.

Another widely expressed view is that because liner shipping is an international industry it must receive special policy handling. Most writers, including the staff of the Department of Justice, argue that the international nature of liner shipping precludes unilateral U.S. deregulation meaning the elimination of antitrust immunity. The same general agreement occurs in the literature regarding the national security role of shipping. However, in all cases acknowledgement of a need for special public policies toward shipping does <u>not</u> lead to agreement on the nature of such special policies.

II. TO WHAT EXTENT DO LINER CONFERENCES INHIBIT COMPETITION?

With regard to liner conferences the policy debate has focused on the impact of conferences on liner market behavior and net economic welfare. Critics of conferences have based their complaints on long standing economic arguments against cartels. In very abbreviated form the argument is that conferences, a euphemism for cartels, attempt to act as profit maximizing, monopoly agents for their members and, in so doing, reduce the output of shipping services available and thus reduce net economic welfare. Proponents of liner conferences have responded with a number of different arguments that, for example, conferences are not monopolizing agents and do not inhibit competition. The following section examines the literature relating to the conduct of liner conferences.

II. A. Arguments that conferences have little interest or ability to restrict competition.

The stated objective of liner conferences is likely to be /57, p. 20/ to "promote commerce for the common good of shippers and carriers." Industry spokesmen argue that conferences have limited ability to restrict competition even if they so desired. Gerald Flynn, Chairman of the Far East Conference /43, p. 14/ contends that even though "member liners of a conference agree not to compete against each other in respect of freight rates /this/ does not, however, imply that they do not do so in other respects." In trades between industrialized nations, Peter Finnerty of Sea-Land /42, p. 6/ claims that the closed conference does not exist. "There is ample competition from many independent lines in these trades ... conferences here normally seek to recruit, not preclude members." Swedish shipping executive von Sydow /100/ and CENSA General Secretary Farthing /39, p. 471/ both agree that "despite the

widespread use of the word 'closed' in relation to certain conferences, none, in fact, are closed; some, notably those in the U.S. trades, are merely more 'open' than others, i.e., the tests for admission are less stringent."

In spirited defense of the conference system, University of Wales maritime economists argue that conferences have few of the attributes of monopolies and do not behave as if they were profit maximizing monopolists. In 1978, Davies /27, p. 99/ argued that barriers to entry in liner shipping:

> are not in general likely to be sufficiently high to deter new entry, and the existence of potential cross entry from established firms indicates that new entry has the possibility of occurring more readily and far quicker than normally imagined ... Moreover, any conference, when setting its prices, must take into account the fact that its market power is limited by both competition from similar cargoes that are shipped to the same destination but from different origins and also the possibility that if the cost of sea transport renders the price of imports high enough, production of those goods may be started or increased in the domestic market, or else substitutes may be brought into use instead.

Evans and Davies /38, p. 160/ cited the possibility of "forward or backward integration into shipping by traditional conference customers", and "pervasive" competition from tramp vessels.

> With the increasing growth of freight forwarding agencies, acting on behalf and consolidating the individual cargoes of many small shippers into shipments of a size sufficient to attract competition from tramps that pose a real threat to conferences ... Last and not least, a conference's freedom of action is clearly limited by the strong bargaining power of ... shippers' councils ...

Finally, Davies and Gardner /30, p. 19/ concluded on the basis of the foregoing arguments:

> that a conference, despite being a cartel, is not an industry unto itself, for it is protected by no institutional barriers to entry and indeed, actual and potential competition is prevalent to a much greater degree than normally recognized, this in turn renders a conference's demand curve kinked and forces it to operate in an environment of oligopolistic interdependence. Together these factors rule out the possibility of a marginalistic approach to pricing and the legitimate use of a textbook monopoly model to explain the rate structure. What is indicated by their competitive oligopolistic environment is that conferences do not have the market power to maintain freight rates above the levels which actual or potential competitors would charge for supplying similar quality services.

Canadian transportation economist Trevor Heaver /57, p. 26/ suggests that conferences' behavior is consistent with a revenue maximization objective and that "the inability of the conference to act as a profit-maximizing cartels is expected."

Transportation specialists Sletmo and Williams devote two chapters of their book to discussion of the decline of market power and the absence of monopoly position of liner conferences. They conclude /94, p. 234/:

> The above inventory of constraints on the market strength of conferences provides overwhelming evidence that their wings have been progressively clipped ... The general support for conferences does not imply acceptance of all conference behavior, but rather a recognition that conferences provide a valuable and indispensable service and that self-regulation in liner shipping has produced a system of "workable competition," which neither a giant international regulatory agency nor "free competition" can duplicate.

Less friendly views that reach the same conclusion are offered by British maritime economist S. G. Sturmey /98, p. 196/ and American economist Daniel Marx, who observes /77, p. 267/ that conference behavior is:

> governed by two conflicting tendencies ... to develop and exploit a monopolistic position, or to suffer from the wastefulness of competition. Nevertheless, the pathological aspects of the industry should not obscure the abundance of healthy tissue which enables many conferences to provide a reasonable degree of stability without indulging in excessive monopoly abuses or inordinate competitive wastes.

Among those who challenge the argument that liner shipping conferences' behavior reduces economic welfare, two sets of work deserve special attention. Both represent the use of modern microeconomic analysis of a higher caliber than many of the papers described above. Moreover, both start from the premise that the objective of cartels, shipping conferences included, is to exploit monopoly power but that in certain cases, shipping conferences included, the consequence of cartel behavior is a net gain in economic welfare.

The first of these works is by University of Liverpool maritime economist E. T. Laing /68/. His model of shipping conferences assumes that they do attempt to behave as profit-maximizing monopoly agents. In so doing conferences would expect entry by non-members attracted by above-normal profits, and Laing argues that conferences attempt to deter such entry by expanding their output beyond the profit maximizing level. This cargo maximization is accomplished by differential pricing that results in cross-subsidization of low value cargoes by high value cargoes. The final result is that conferences accomplish profit maximization by "maximizing cargo tonnages and consequently the number of ships on which only normal profits are made ..." Thus, in attempting to behave like a profit-maximizing monopolist, conferences produce a level of shipping services that exceeds the level to be expected in a competitive solution, without above normal profits, but with some income

redistribution between consumers and producers of high-value cargoes and consumers and producers of low-value cargoes.

The second set of work was initiated by a distinguished American economist, Donald Dewey of Columbia University /33/. Dewey's work involves more general propositions and may incidently be applied to the behavior of liner shipping conferences. Specifically Dewey offers a theoretical argument that in the case where "firms pool their data on prices and costs in order to gain a more accurate picture of 'underlying business conditions'" the result may be more stable prices which in turn may induce a higher level of industry output. His model assumes that entry into the market is not restricted. He concludes /33, pp. 593-594/:

> In a model incorporating the assumptions used in this analysis (most notably the assumption of free entry) economic welfare will be greater under a legal system that permits collusion than under one which effectively suppresses or restricts it ... The advocates of strong measures against price fixing and information exchanges should no longer be allowed to treat the welfare case for their position as nearly self-evident.

As noted, Dewey is making a general case although he does mention the shipping industry /33, p. 558, fn. 1; 121, pp. 276-277/. Furthermore, it is interesting that industry arguments favoring liner conferences have largely based their case on rate stability. At the very least, the theoretical arguments of Laing and Dewey merit empirical testing.[1]

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[1] Dewey's paper generated an unusually large volume of commentary which was consolidated by the American Economic Review into 18 pages of a subsequent issue /121/ plus a five page reply by Dewey.

It is too soon to suggest that Dewey's analysis undermines the most cherished notion of U.S. antitrust policy. But the Dewey paper is one contribution to the wide-ranging debate over appropriate government intervention in the U.S. economy.

II. B. Arguments that conferences' principal objective is to restrict competition.

British critics Bennathan and Walters /9_/ offer vigorous argument that conferences are not beneficial. First, they contend /9, p. 93/ that conferences make no effort to exploit possible economies of scale, or to "integrate technologically." "The efforts of collusion are directed entirely towards freight rate and service regulation -- to keep the rate high and 'remunerative' and to keep competitors out." They examine the arguments for conferences based on rate stability which they "found rather weak." Finally they /9, p. 113/ challenge the argument that conferences reduce costs and charge lower rates:

> a good deal of the arguments in favor of shipping conferences are based on the idea that the cartels can eliminate certain wasteful forms of competition and rationalize operations, and thus charge lower prices. Our evidence discredits this argument.

Equally hostile views are expressed by the U.S. Department of Justice /107/ spokesmen which have argued that even "if foreign policy dictates that we continue to permit price-fixing cartels", the power of cartels should not be enhanced by other U.S. shipping policies. Specifically, the DOJ position paper claims that elimination of FMC policing would result in making liner shipping more competitive!

Likewise, U.S. economist Allen Ferguson /40/ takes a strong anti-conference position in opposing S. 47, the recently passed Senate bill on shipping regulatory reform. Ferguson's arguments are standard anti-cartel arguments. In opposing further antitrust exemption for conferences, he asserts /40, p. 29/ that "no industry can be made 'more competitive' by making it more monopolistic."

A somewhat less hostile view is taken by British academics Deakin and Seward /31, pp. 70-71/:

> A shipping conference is a device for establishing and continuing a collective monopoly of a particular type of freight shipping service. In its roles of setting common prices and sharing output, in various ways, amongst member lines a conference functions as a cartel... a fairly loose organized collective monopoly with some, not very great intra-conference, non-price competition... A conference has some power to raise prices above cost for some services, but this power is continuously subject to erosion by outside competition ...

In an interesting footnote to the motivations of liner conferences, the law that exempts conferences from Canadian antitrust policy is due to sunset in 1984. Presently an investigation is being conducted to recommend a renewal of the exemption. It has been reported /122/ that existing conferences have threatened that member lines will withdraw from Canadian services if the exemption is not renewed.

II. C. Empirical studies of conference behavior.

Empirical studies of liner conferences are limited by the difficulty of obtaining pertinent data. However, there is modest literature and, notably, it includes a series of studies examining the factors that explain conference freight rates. Because of the data problems mentioned, these studies deal primarily with U.S. trade for which conference tariffs are publicly filed.

Typically these studies have involved multiple regression analyses relating freight rates to measures of stowage, unit value of commodities shipped and perhaps other influences on the trade of particular routes in a given direction. Stowage is a measure of the bulk of a commodity, e.g., cubic feet per ton. As for most transport modes, ships tend to fill available space more quickly than weight carrying ability. Canadian transportation specialist Trevor Heaver /58; 59/ performed regression studies of California and Pacific Northwest trade with Japan, Asia, and Australia. He found that most of the variability -- 75 to over 90 percent -- in liner freight rates was explained by the stowage factor, commodity value per ton and at most one other factor. He concludes /59, p. 25/:

> The research supports the notion that conference (sic) are large inflexible cartels for which the rate structure on any one route is based on universally applied "principles of ratemaking" modified as a result of external pressures and not the deliberate and careful exercise of discriminatory pricing policy.

In a later reinterpretation of the same results /58, p. 263/ he finds:

> Conference rates ... rather than being set on the basis of 'what traffic will bear', accident and chance, are set in a system in which a cost factor is a fundamental part of the rationale.

Maritime Administration official James R. Carman /16/ attempted a similar analysis for the westbound trade from the U.S. East Coast to the Far East using 1973 data for seven commodities. Carman was not experienced in using and reporting statistical analysis; consequently, it is difficult to directly compare his results with those of Heaver. However, he basically found the same relationships as Heaver with apparently similar levels of statistical significance for the stowage factor and unit value.

A second Canadian study by Ingrid Bryan /15/ examined two models relating to conference behavior. The first models freight rates by trade route. Using data for 26 U.S. and Canadian trade routes, Bryan regressed freight rates on unit values of commodities, stowage and the quantity of the commodity shipped in the previous year. The second study models rates by commodity. For 25 commodity groups, she regressed rates on distance shipped, number of non-conference liners operating on the route, quantity of the commodity shipped in the previous year and a dummy variable for monopoly routes. Results for the first model indicated R^2 between 0.4 and 0.89 with unit value and stowage variables both typically statistically significant at least at the five percent level. The quantity variable was generally not significant. The results for the second model indicated much lower R^2 values with equations for eight of 25 commodity groups not being significant at the five percent level. Among those equations with significant results, the coefficients for distance (positive values) and numbers of non-conference competitors (negative values), were most often significant. Results for a combination of the two models had an R^2 of .77 and the significant coefficients were unit value, stowage, distance, number of non-conference liners, and quantity of commodity moved. She also found some differences between Canadian and joint U.S.-Canadian conferences.

Strikingly similar results were reported in a National Bureau of Economic Research study by Lipsey and Weiss /71/. This study is notable for its high caliber of scholarship. The authors used realized freight rates rather than rates from posted tariffs. Realized freight rates were derived by subtracting value of imports at the point of entry into the U.S., including freight and insurance, from the value at the point of shipment, excluding freight and insurance, for Bureau of Census data on U.S. imports.

They also attempted to cross-check their findings by using data from independent sources. In general the study reflects unusually careful and thoughtful analysis. For 28 commodity groups moving on 27 U.S. trade routes, Lipsey and Weiss regressed freight rates on unit value, distance, stowage, and dummy variables for small shipments (under one ton) and for commodities that also moved on tankers. The results indicated a R^2 of .81 with all coefficients being significant at the five percent level and having expected signs.

One final study by Shneerson /91/ attempted to investigate the role of the stowage factor in determining liner rates. Shneerson examined the relationship of weight, bulk, and stowage in cargo handling production functions and cost (of stevedoring) functions. He found that stowage was the most important variable in explaining cargo handling costs. Shneerson then examined a model of posted liner freight rates for 42 routes (inbound and outbound) involving trade by Thailand, Singapore, and Israel. The statistical results indicated R^2 values from .26 to .97 with unit value and stowage typically having expected signs and being significant at the five percent level. Shneerson concludes /91, p. 66/ that his findings indicate "a certain degree of arbitrariness in the use of the stowage factor for fixing rates." He argues that the stowage factor is not used consistently to reflect the

opportunity costs of commodities carried, rather low density cargo is rated according to the stowage factor and high density cargo is rated according to weight.

Shneerson's study is largely based on data developed by Bennathan and Walters /9; 10/. For trade in Southeast Asia, Bennathan and Walters attempted to contrast the structure of freight rates between routes on which conferences prevailed and those free of "conference regulation." They did observe /9, p. 100/ some price discrimination on all routes studied, but less on the free routes.

> On the whole, however, transport pricing on the free routes presents a clear contrast to that on the conference-regulated routes in that the dispersion of commodity rates is much narrower. There is a stronger tendency to put one and the same price on any one unit of ship space, irrespective of such characteristics of commodities as are relevant to the cost of carrying.

The Devanney et al. simulation of U.S.-South America trade also includes an analysis of prevailing freight rates /32, pp. 163-169/:

> By far the most striking feature ... of the rate data is the difference in the average freight rates northbound and southbound: the average rate southbound is over three times the average rate northbound...
>
> The obvious question is: is this observed rate structure consistent with the cartel attempting to set monopoly profit-maximizing rates? We believe it is.

They base their conclusions on the nature of cargoes moving in each direction. Northbound cargoes "tend to be large consignments of primary commodities (copper, fishmeal, bananas and coffee) shipped by centralized and well-organized exporters on a regular basis." These shippers have and could again charter their own vessels. Southbound cargoes are largely small,

irregular shipments of manufactured goods. Thus, the authors are contending that freight rates basically reflect differences in demand elasticities.

A second paper by Canadian economist Bryan /14/ presents an attempt to test explicitly the hypothesis that conferences behave as profit maximizing cartels. On the basis of that assumption, she attempts to derive a model of expected freight rate changes.[1] The model related rate changes to demand and supply elasticities and the ratio of the freight rate to the price of the commodity. Lacking sufficient data to estimate the hypothesized model, Bryan proposes an empirical model relating freight rate changes to the price of the commodity, stowage factor, the number of non-conference liners on the route and the quantity of the commodity shipped. (In other words, Bryan has substituted rate change for rate levels in the model used in her first paper.) She finds an R^2 of .18 and significant coefficients for each variable. Her conclusions are rather ambiguous but she does claim /14, p. 300/ that "competition between conference and non-conference liners on routes tended to moderate the level of general rate increases which the conference could introduce."

The Bryan paper was subsequently criticized by Garrod and Miklius /49/ on the basis that the empirical model is not consistent with the theoretical proposition supposedly considered. As a result, it is argued that no inferences about conference behavior as price discriminating, profit maximizing cartels can be drawn from Bryan's empirical results. The conclusion is certainly correct that Bryan's model does not refute the theoretical assertion that conferences behave as price discriminating, profit maximizers.

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[1] Bryan's model is derived from a formula for the elasticity of demand for transportation cited by Bennathan and Walters /10/. Shneerson /91, p. 57/ and Vanags /118/ both demonstrate that the cited formula is appropriate subject to highly restrictive qualifications.

The model does indicate that liner rates are discriminatory and that competition moderates freight rate increases; both are useful pieces of evidence.

An empirical study of conference tariffs by maritime economist J. O. Jansson /63/ offers some support to the theoretical arguments by Laing /68/ discussed above. Jansson compared net freight rates on tariffs filed with the FMC for five conferences in 1964, to unit costs for U.S. and foreign-flag members of each conference. The cost data were from a cost study done for the Maritime Administration by Ernst and Ernst. For groups of 13 to 19 commodities on five different conference tariffs, Jansson clearly demonstrates a cross-subsidization among commodities. He argues /63, p. 306/ that if liner shipping is not subject to constant returns to scale, "the very fact that discriminatory charging is applied is indicative of cross-subsidization (unless, of course, huge monopoly profits are being made by liner companies)." The latter condition is not typically the case in liner shipping.

Finally, the study of Deakin and Seward /31/ provides some empirical evidence on several aspects of conference behavior. For example, with regard to the question of whether or not conferences are price discriminators, Deakin and Seward /31, Ch. 6/ examine rate making behavior by the UK-Continent/Australia conferences. Specifically, they report a numerical analysis of conference responses to shippers' requests for freight rate reductions. When such requests were made at times other than when general rate increases were posted, about one-third of such requests were granted. When reductions on individual commodities were requested on general rate increases less than 20 percent were granted. After a further examination of specific case histories, Deakin and Seward /31, p. 143/ conclude that "charging what the market will bear ... is apparent in all these cases..."

Deakin and Seward also examined /31, p. 143/ a model of conference freight rates, similar to those discussed earlier in this section. For five conference vessels and 4,359 cargo consignments, their statistical results indicate R^2 between .03 and .52 with the unit value coefficient accounting for from 61 to 85 percent of the explanatory power of the model.

Almost unique among empirical studies is Deakin and Seward's examination of financial data for a conference and its constituent lines. They conclude /31, p. 209/:

> In terms of physical capital utilization of the conference group ... uses the large amount of physical capital it employs to a reasonably full degree in comparison with other British industries and there is not very much variation between members in this respect.
>
> ... but this high level of capital utilization is ... not a sufficient condition of efficient operation ... it is found that not only is profitability very low, in comparison with other British industries, but it also varies widely between members.
>
> ...
>
> In the ten year period studied, 1958-1968, none of the weaker members has dropped out of the conference group ... it may be concluded that the conference operates ... to ensure the financial viability of all members.

II. D. The impact of independents on conference operation.

To provide some background to the discussion of the impact of independent liner operators on conference operations, the FMC studies /109; 110; 112; 113/ of the major U.S. liner trades give statistics on the relative size of independent operators in U.S. markets. Beginning with the North Atlantic/Europe routes /112, p. 27/, the FMC reports that only by the late 1970s had independents been able to capture small market shared. "The inability of independent carriers ... to offer a stable and continuous service has resulted in the North Atlantic trade being characterized as a graveyard for independents." The report lists /112, pp. 28-30/ ten independent export liner operators as of October 1, 1978. The ten firms offer about 28 percent of total annual capacity in long tons. But in terms of containerized capacity the report attributes /112, p. 36/ six independent operators with about half the total annual capacity in long tons but less than ten percent of the containerized capacity. On U.S. Gulf/Europe routes four independent lines are listed /112, p. 40/ as providing about 22 percent of total annual tonnage but only 12 percent of container capacity.

The Latin American trade study indicates that most U.S./Latin American trades are controlled by conference carriers. The study /113, p. 43/ notes that the exception is the U.S./Venezuelan trade. Of 21 lines serving the U.S. Atlantic/East Coast South American trade, ten operators are independents, including the largest carrier -- Imparca Line with 15 percent of the annual tonnage capacity -- as of July 1979. On the U.S. Gulf/East Coast South American trade /113, pp. 54-55/, no independents are reported; and on U.S. Pacific/East Coast South America one of five lines is an independent /113, pp. 55-56/. The West Coast South American trade is also dominated by conference carriers /113, pp. 56-61/. One independent competes with six conference

carriers serving U.S. Atlantic ports. Two independents with about 20 percent of capacity compete with eight conference operators serving U.S. Gulf ports and there are no independents among six carriers serving U.S. Pacific ports.

An entirely different environment prevails in U.S./Far East trades according to that FMC study. For 1977 and 1978 /110, p. 137/, inbound trade by conference members ranged from a low of 52 percent to 90 percent for the four inbound conferences and the report notes that over the two-year period conference shares declined. Among the outbound conferences, two accounted for 86 percent of 1977 trade /110, p. 138/. The conference members' share of the relevant trade amounted to 65 and 74 percent in 1978. Clearly then, independents have been a major factor in U.S./Far East liner trades.

The 1981 Australian Trade Study /109, pp. V-2, -3/ reports that the U.S./Australia-New Zealand trade is principally covered by two conferences. The Atlantic coast conference included five members and the Pacific coast conference included four. In addition, four independent operators served this trade, but only one line had a substantial share.

On the basis of thse FMC studies, it can be concluded that except in those Latin American trades in which bilateral agreements or revenue pooling exist, some independent liners operate in virtually all U.S. trades. However, only the U.S./Far East trade has as much as 20 percent of liner trades captured by independents.

The literature dealing with the impact of independents on conference behavior is consistent with the FMC's observed pattern of independent operation. That is, different observers at different times and places have assigned differing value to independents' relative importance. In historical perspective, D. L. McLachlan /80/ reports a number of cases in which independents successfully penetrated conference dominated trades, usually

later to become members of the conference themselves. Similar episodes are reported by Deakin and Seward /31/ in their study of U.K.-Australian, Far Eastern, and Indian trades.

Bennathan and Walters /9, p. 111/ observe that independents

> seem to follow the rates and conditions of the conference and rarely, if ever, attempt to compete away the traffic of the conference. In some cases the non-conference liners seem to be serving a sort of probation period in an attempt to get into the conference.

UWIST observers Davies and Gardner /30, pp. 25-26/ interpret the role of independents differently. They contend that independents and potential entrants into liner trades force conference members to engage in a limit pricing strategy and constrain conference members to "minimize service costs."

In a study of Australian liner shipping during the 1960s, P. E. Stonham /96/ cites behavior consistent with both of the above views. He notes /96, pp. 206-207/ that in 1966 the Australian government took the position of supporting closed conferences but despite this action, independents still entered the Australian liner trade. "It is ... not uncommon for non-conference lines to be trading (on a small scale) alongside conference ships ... with no outward signs of freight warfare." However, in the case of the rapidly growing Australia/Far East trade, Stonham cites an instance of a new consortium seeking entry into the existing conferences and initiating a rate war when entry was denied. After significant declines in rates, the new entrant was granted limited concessions for introducing container operations.

A 1978 study by Booz, Allen, and Hamilton /11/, of the differences between inbound and outbound freight rates in U.S. liner trades, suggests that competition between independent liners and non-liner vessels may contribute to the disparities. The report gives market shares for independent liner

and non-liner operators on major U.S. trade routes.[1] For example, in 1974 independents were reported as accounting for 17 percent of inbound trade and 10 percent of outbound on U.S. trade route 29, the U.S. Pacific/Far East route, while non-liners were shown to have 6.1 percent of inbound and 17.8 percent of outbound trades on that route. On the basis of these market shares the report concludes /11, p. V-12/ that "the competitive pressure of both independents and non-liners on conference freight rates is significant."

Even more recently a Seatrade /19/ analysis of competition in the container trade reports that on the major world routes -- North America/Far East, Europe/North America, and Europe/Far East -- non-conference capacity is increasing rapidly. The story claims that between mid-1979 and mid-1982 conference container slots increased by 13 percent to approximately 5.5 million slots while at the same time non-conference slots increased "over four times as fast ..." The article goes on to discuss average carrier revenues and operating margins over the same period. The author clearly intends to imply that declining operating margins are a consequence of independents' expansion. It should be noted -- and is not in the article -- that a number of factors could contribute to conference members' operating performance. The article provides a very interesting discussion about the incentives for varying ship speeds. On the one hand, higher fuel costs encourage reduced steaming speeds and conversions from steam to diesel power. On the other hand, service competition from independents and within conferences is encouraging some operators to increase speeds and reorganize route structures.

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[1] There appears to be some discrepancy between the Booz, Allen figures for the North Atlantic /11, p. V-10/ and those in the FMC trade study /112, p. 27/.

Finally, with respect to the impact of independents on conference behavior, the statistical analyses of Bryan and perhaps others discussed in the previous section are relevant. In particular Bryan's papers /14; 15/ expressly account for the effect of non-conference shipping on freight rates and in each instance the results were a significant reduction. Other studies among the regression analyses of the determinants of liner freight rate indirectly reflect the effect of non-conference competition in terms of differences in the strength of statistical relationships among different trade routes examined. The evidence seems fairly clear that independent operators do limit the pricing discretion of conferences. Certainly there may be instances in which independents are largely price followers but clearly there are instances when independents disrupt conference behavior.

II. E. Competition within conferences.

1. Internal cartel regulation.

Liner conferences coordinate ratemaking, capacity, and service levels among their member shipping firms. The economic theory of cartels predicts that the same incentives that bring competing firms to attempt to coordinate the decisions mentioned above also work to undermine the cartels' existence. That is, by coordinating pricing and output decisions, cartel members expect to increase total profits but the higher profits, in turn, provide individual cartel members an incentive to expand their own output. Thus effective cartels must regulate the output levels of member firms.

There are a number of methods by which conferences attempt to control members' output levels. For example, sailing quotas set the number of sailings per year from a particular port. Because the frequency of sailings offered is a marketing tool, Bennathan and Walters /9, p. 106/ contend that such quotas are a source of conflict within the conference. L. G. Hudson, writing about the oldest operating conference, the India-Pakistan-Bangladesh Conference /60, pp. 250-251/, apparently agrees that regulation of the number of sailings is difficult because of the problem of assessing and controlling the number.

A second allocation device is a cargo quota which limits the number of tons moved or a certain percent of total cargoes for a given port annually. Such quotas are sometimes assigned only for certain desirable cargoes. Hudson /60, p. 252/ notes that one problem with tonnage quotas is that a line may lift its share in relatively large "parcels" and reduce its frequency of sailings or not lift less desirable cargoes. "The ability to be selective would also create malpractices." Deakin and Seward /31, pp. 65-66/ describe a "comprehensive cargo sharing arrangement" used by the Far Eastern Freight Conference (outbound from northern European ports). The conference estimates

cargoes to be available for the ensuing two-month period, then allocates cargoes among the carriers, and programs the rotation of the berthing of ships. Apparently the conference found this method to be very successful and used it for at least 20 years.

Hudson /60, pp. 251-252/ discusses a method of control by space provided at a given port. A member's level of service at port is in proportion to the line's port facilities. Hudson describes a system very much like a cargo or revenue pool in which over and under-carriage is recorded. He observes that the method "is not suitable in Conference trades with numerous loading ports since the production of accurate space return is extremely difficult and liable to falsification." Still another device involves route restrictions or restrictions on ports served /9, pp. 107, 108; 31, p. 65/.

Finally, the most comprehensive method is using revenue pooling. Deakin and Seward /31, p. 36/ point out that "joint purse agreements" existed even before conferences. They describe /31, pp. 66-68/ the revenue pooling arrangements adopted by the UK-Continent/Australia conferences. Hudson /60/ discussed many aspects of revenue pooling and provides a numerical example of a pool settlement. Bennathan and Walters /9, p. 107/ argue that revenue pooling "encourages the growth of low-cost firms and increases the adaptability of the industry." Hudson /60, p. 257/ gives some support to that position by arguing that pool shares are likely to be determined by past performance and most likely then by profitability since past earnings levelings "is the position Lines will seek to retain." If profitability determines pool share then presumably the low cost operators' share will increase. McLachlan's study /80, pp. 56-57/ of the history of conferences affords some confirmation of that argument. He reports that the Japanese were successful in penetrating conferences dominated by the British at least in part

because of lower operating costs. Gradually the Japanese lines forced reduction of the British share of the Bombay-Japan Conference trade.

Thus, there are many mechanisms by which conferences seek to control the total level of services offered and allocate that service level among their members. Some methods work better in certain types of routes but all methods are subject to breaking down.

2. Internal cartel competition.

As noted, each of the methods of cartel regulation is subject to problems of internal conflict. One of the consistent predictions of cartel theory is that cartels are subject to excess capacity.

Examples of theoretical analysis of cartel capacity decisions include the Baesemann et al. paper /3_/. A game theoretic model predicts conditions under which excess capacity would prevail and predicts that, in general, the tendency toward excess capacity increases as the number of firms in the cartel increases. Thus, if a U.S. open conference attracts more members than an alternative closed conference, excess capacity is more likely (p. 27). The model also predicts that reductions in capital costs and/or operating costs encourage an increase in the capacity/output ratio, exacerbating the problem (pp. 27-28).

In a less rigorous discussion, Roberts /87, pp. 43-44/ argues that without explicit conference controls, members will have incentives to increase output in order to increase their share of cartel revenues. The constraint on this behavior is the cost of increased capacity. Thus increased levels of service competition increase costs and reduce monopoly profit. Roberts concludes that in "a truly open cartel," expansion of capacity will continue until the cartel collapses or all excess profits are absorbed.

In a recent paper the staff of the Antitrust Division of the DOJ /107, pp. 33-35/ has presented the argument that intra-conference competition takes the form either of secret rebating or service competition. Because U.S. conferences have the FMC act as a very effective enforcer of conference tariffs, U.S. conference members make a trade-off of increased levels of service competition.

E. T. Laing's /68, p. 145/ interesting paper on conference behavior includes the argument that a member's "profits (or losses) are usually related directly to the number of ships he has on a route, and the balancing of marginal costs and marginal revenues is not a significant issue." He contends that more ships mean more frequent service which is likely to attract high value cargoes. "But the profitability of being able to make this sort of 'lottery' profit falls as the number of ships on the route increases ... A large number of ships is therefore a least-risk policy, insulating the lines from lottery risks."

Heaver /57, p. 24/ questions the above motivations for excess capacity. He argues that:

> To ensure customer loyalty conferences try to meet capacity requirements and tend to plan for high-density traffic conditions. As a result, overcapacity is a frequent problem.

Bennathan and Walters /8, pp. 163, 173-175/ argue that one product of internal conflicts is revenue pooling which provides "automatic internal discipline." They even conclude that if cartels are permitted "then pooling does permit a better allocation of traffic within the cartel. It allows the expansion of efficient low-cost firms in the cartel, and promotes the contraction of the inefficient ones."

3. Recent experience with conference behavior.

Recent experience in the U.S. Pacific/Far East trade illustrates the possible conflicts that may develop within liner conferences. Trade volume and shipping capacity increased rapidly on U.S./Far Eastern routes during the 1970s and a number of new carriers -- notably Taiwanese, Singaporese, and Soviet -- entered the trade. As early as the fall of 1978, Sea-Land urged a conference response to pressures from the increased capacity /73, p. 84/. While Japanese conference members resisted any reduction of rates, Sea-Land suffered losses in market-share and earnings. Sea-Land's management reacted by announcing in April 1979 that the firm would withdraw from the conferences /73, p. 85/. In fact the company did not withdraw until January 23, 1980 /22, p. 6A/. The result was a rate "war" in which it is reported /73, p. 86/ that rates fell 20 to 40 percent. Sea-Land apparently recovered its lost market share and even increased its earnings in 1981 relative to 1980. At the same time, Sea-Train failed, the Soviet line FESCO had been shut out of U.S. ports, and other independents reduced their capacity on the trade /73, p. 86/. Finally in the spring of 1981, the conferences acquiesced to Sea-Land's demand for some ability to exercise independent action. Thus it was predicted in June 1981 that Sea-Land would re-enter the Pacific conferences in the fall of that year. In September 1981, the east- and westbound U.S./Far East conferences announced intentions of raising freight rates early in 1981 /21; 22; 23/. Apparently the announcements were intended to test the independents' reactions and to signal Sea-Land that peace was at hand. The news stories imply that there remained considerable disagreement among conference members /86/. On the one hand, there were expressions of optimism by conference members and Hapag-Lloyd, an independent on some routes, indicated an interest in rejoining

some conferences. On the other hand, Sea-Land had not rejoined the conferences and was reported to be unwilling to indicate its plans. There were indications of "rationalization" plans by several groups of liner firms operating in U.S./Far East trades /86, p. 24B/. By November 1982 /24/ the eastbound conferences had announced further rate increases that would have the effect of restoring the rate levels of June 1979. Sea-Land has yet to rejoin the conferences. Even the Japanese members of the U.S. Pacific conferences have not been immune. In March 1983, it was reported /25/ that one of six member firms in a Japanese space chartering agreement, in effect for 15 years, was planning to withdraw when the current agreement expires in August 1983. Apparently conflicts developed between the participating firms with regard to scheduling.

Non-U.S. conferences are also subject to disputes. Beginning in 1981 /4; 5/ with the resignation of the Danish line, Maersk, the Far East Freight Conference has been in conflict. In November 1982, the conference announced a 5-10 percent rate reduction.

Thus, shipping conferences apparently do conform to the behavior patterns predicted by cartel theory. At least under certain conditions, for example, periods in which capacity exceeds the demand for shipping services, the incentive for gain by individual firms overcomes the incentive for cooperation, and conference agreements break down. The evidence seems to indicate that U.S. and non-U.S. conferences are subject to these same tensions.

II. F. Technological change as a competitive factor for liner conferences.

The following discussion will consider two aspects of the importance of technological change for liner conferences. First, there will be a discussion of the literature that assesses the impact of past changes in shipping technology and the prospects for the future innovations on liner conferences. Second, the literature dealing with conferences' response to technological change will be examined.

With regard to the past and prospective changes in shipping, the origin of liner conferences coincides with the period of rapid growth in the use of ocean-going, steam powered vessels /77, pp. 45-46; 99, p. 324; 61, p. 481/, during the 1860s and 1870s. Steam power permitted ships to observe fairly regular schedules and thus inaugurate the type of service that now distinguishes liner service from tramp shipping. Thus, it is generally believed that the technological innovation of steam power led to the formation of liner conferences.

Among the recent technological changes that have affected liner shipping and consequently liner conferences are containerization, neo-bulk operations, and air freight. Containerization has affected the productivity of liner shipping and thus has affected conferences' ability to control capacity and maintain stability within their trades. Neo-bulk shipping and air freight represent direct competition for liner shipping and thus affect the demand for conference members' services.

With regard to containerization, there is a considerable body of shipping literature tracing the history and impact of this development. For an extensive discussion of the technological aspects of containerization, see the book by Whittaker /123/, and the paper by ship architect C. R. Cushing /62, pp. 46-55/; shorter and less technical discussions are available in Sletmo and

Williams /94, pp. 31-34/ and Nersesian /84, pp. 92-108/. Discussions of the economic implications of containerization are discussed by Katz /65, p. 29/, Larner /69, pp. 113-118/, and Johnson and Garnett /64/. Larner's analysis includes estimates of the relative savings in cargo handling and ship operating costs deriving from containerization.[1] He also discusses the capital requirements for container operations.

Containerization brought a dramatic restructuring of costs in the liner industry and compelled a complete reorganization of that industry within a relatively short period of time. There is no thorough discussion of the impact of containerization on the behavior of liner conferences, although many sources briefly discuss this issue. Clearly, by substantially increasing cargo handling productivity and reducing port times from days and weeks to hours, container operations immediately introduced excess capacity on the affected routes -- the North Atlantic and Far East. As discussed above, the critical element in the ability of conferences to remain effective is control of the level of capacity and service. The reaction of liner firms and conferences was to attempt to control capacity. Many non-U.S. shipping companies formed consortia /118, pp. 4-5; 110, App. 2/ and in the North Atlantic, the international routes on which the containerization was initially introduced, the conferences attempted to form a so-called super-conference and to effect an extensive pooling agreement /69, pp. 118-125/. At this same time among U.S.-flag carriers, Sea-Land and U.S. Lines proposed to merge /63, pp. 125-128/. In the case of the proposed North Atlantic pool and the Sea-Land-U.S.L. merger, extensive public debate over U.S. shipping policy eventually

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[1] For recent estimates of comparative per box (TEU) operating costs, see Frankel /46, Vol. 3/.

led to the failure of those proposals. A recent GAO report /114, pp. 3-11-3-29/ analyzes the response of U.S. liner operations to the advent of containerization. The report concludes that i) the apparent decline in the number of ships and number of seafarers in the U.S. liner fleet actually reflects the response to changes in technology, and ii) the U.S. fleet in fact expanded during the 1970s in terms of cargo movements.

Within the past 15 years two major competitors to the liner shipping industry have emerged. Those competitors are air freight and ocean shipping operations, referred to as neo-bulk. Sletmo and Williams /94, p. 116/ developed indices of U.S.foreign trade tonnage carried by liners, non-liners, and air carriers between 1965 and 1975. Liner tonnage varied only slightly from the 1965 level over that entire period and, when updated using MarAd's 1980 annual report (p. 19), had risen only slightly by the end of the 1970s. Non-liner tonnage, on the other hand, increased 59 percent between 1965 and 1975. MarAd figures (p. 19) indicate that non-liner tonnage, excluding tanker tonnage, increased 42 percent over the decade of the 1970s. Air cargo tonnage, however, increased almost 300 percent over the period 1965 to 1975. A Transportation Systems Center study of the demand for ocean shipping /83, pp. 3-7/ indicates that in 1976 air carriers moved 2.46 billion pounds of U.S. exports and imports, valued at an average of $10.32 per pound. By comparison 38.2 billion pounds (or 19.1 million tons) moved by containerized methods and that cargo was valued at $0.75 per pound. Clearly, liner shipping has been subject to severe competition from other, mostly new modes. Air freight has captured high value cargoes that, of course, may never have been available to liner vessels. On the other hand, the growth of non-liner tonnage has taken significant shares of cargo that otherwise would have gone by liner vessels. Neo-bulk refers to shipments averaging between 200 and 7,000 tons. Sletmo and Williams

/94, pp. 120-122/ discuss this development on the basis of a 1972 MarAd report entitled Neobulk Shipping Study. Based on an analysis of the size of liner shipments, this report estimated that for the period 1967 to 1970, 35 to 50 percent of liner imports and 50 to 60 percent of liner exports could have been carried as neo-bulk. A more recent analysis of neo-bulk operations by H. P. Drewry Ltd. /36/ and reviewed in Seatrade /85, pp. 39-40/ indicates that by 1979 world seaborne trade carried by neo-bulk carriers amounted to 275 million tons.

Recently, a serious challenge to liner operations has come from the operation of combination bulk-container vessels. A European shipping operation, the Cast Group, has served Canadian ports on the North Atlantic trade during the 1980s. Even though the operation is currently in financial difficulty the prospects are that the concept will survive /20/. The Cast operation evidently has been a major contributing factor in the so-called Canadian diversion problem. Cast rates were substantially below those of U.S. conferences and have attracted cargoes from U.S. shippers. Financial difficulties led Cast to increase its rates in early 1982 /34, p. 13A/. Nevertheless, the threat of the Cast operation has inspired an attempt to require tariff filing with the FMC of any cargoes leaving the U.S. that will ultimately be intimidated if its below-conference rates were publicly posted; Cast spokesmen did testify against the proposed legislation.

The second point to be discussed is the role of liner conferences in promoting or discouraging technological development. Critics of liner conferences have argued that conference behavior deliberately discourages cost saving innovation. The Department of Justice analysis /108, pp. 224-227/ specifically cites containerization and FAK (freight of all kinds) rates

as innovations introduced by non-conference operators. Former FMC Commissioner George Hearn /56, pp. 173-174/ accused conferences of resisting containerization. Conference proponents Evans and Davies /38, p. 172/ do suggest in their criticism of U.S. shipping policies that closed conferences would have planned the introduction of containerization to comport with the requirements of "supply and demand." Likewise conference proponents Sletmo and Williams /94, p. 305/ support the idea of planning for capacity investments in the face of such a new development. They imply criticism of the current plans by Malcolm McLean /94, pp. 301-302/ to build a fleet of enormous container vessels. Ironically, conference critics Bennathan and Walters /8, pp. 172-173/ argue that revenue pools are to be preferred, if conferences are allowed, because they allow expansion of efficient, low cost members and could be expected to "be less inimical to technical progress ..." The evidence /47/ from existing revenue pools in U.S./Latin American trades does not seem to support Bennathan and Walters.

The second section of the review examined the ability of liner conferences to inhibit competition. Not surprisingly, the literature includes sharply divergent views regarding the motives and objectives of liner conferences. Two particularly interesting works contend that even with the motives and objectives of profit maximizing monopoly agents, conferences may make higher levels of shipping services available to society than would exist in a competitive regime.

A number of empirical studies indicate that the level of liner conference rates is explained primarily by the value per unit of commodities and the bulk of commodities, or stowage factor. These results reflect the use of price discrimination in the setting of liner rates. Such discriminatory pricing is found in virtually all transportation modes.

An examination of the limitations on conference market power indicated that independent operators are a factor in all U.S. liner trades except where precluded by government policy. In certain very attractive trades, for example, the U.S.-North Atlantic and U.S.-Far East routes, independents have occasionally caused conferences to break down. Moreover, conferences are not monolithic and internal tensions, particularly when reinforced by competition from independents, do lead to the classical cartel instability problem. Perhaps the most important limitation on conference behavior is technological change. Recent technological factors affecting liner shipping have been containerization, air freight, and neo-bulk shipping.

III. POTENTIAL BENEFITS THROUGH RATIONALIZATION OF LINER SERVICES

Recent policy debates concerning liner conferences have devoted much attention to the ability of liner conferences to accomplish "rationalization" of liner services and to the benefits to be derived from such "rationalization." Some industry observers have claimed that U.S. shipping policy inhibits liner conferences from accomplishing rationalization which could result in improved industry efficiency, lower costs, and, ultimately, lower freight rates. The following section of the review examines the literature relating to the concept of rationalization of liner services.

III. A. The definition of rationalization.

The word rationalization, appears frequently in discussions of ocean liner shipping. However, there is no single, consistent definition of the term. In fact, only rarely is any explicit definition provided.

Typically, the use of the word rationalization has implied a coordination among liner conference members of the supply of liner services. For example, in a paper defending the role of liner conferences, British maritime economists Davies and Gardner /30, p. 15/ argue that "great savings in cost may be realized if separate liner companies co-operate so as to rationalize the use of their combined capacity ..." In a criticism of U.S. shipping policies, Sea-Land Vice President Peter Finnerty /42/ contends that "the absence of an ability to rationalize services" handicaps U.S liner operators. He commends proposed legislation to permit agreement "to coordinate use of facilities, vessel space, equipment, and terminals" (p. 3). Merchant Marine Academy faculty member Harold Katz /65, p. 23/ refers to policy recommendations to permit "conferences to 'rationalize' industry operations in the interests of greater efficiency."

In a paper on maritime policy, a group of Northwestern University transportation economists /3, p. 3/ distinguishes so-called closed conferences' discretion to "control capacity, allocate freight, pool revenue, employ deferred rebates and rationalize services." A somewhat more explicit definition is offered by FMC economist Robert Ellsworth /37, p. 498/ who points out that "all governments, except the United States, have decided ... that rationalization (integrated planning in the supply of vessels and equipment) is more efficient than open competition."

A second group of examples from the shipping literature implies a slightly broader definition of rationalization. The committee print of the proposed "Shipping Act of 1982," S. 1593 /106/, refers to "the economics of rationalized or joint services" (p. 8) and to "rationalization, including pooling agreements to share revenues or cargoes" (p. 17). Strangely, the proposed bill's definition of terms (Section 3, pp. 26-28), does not include the term rationalization. Another defense of conference behavior by University of Wales maritime economists Evans and Davies /38, p. 159/ argues that one motive for the formation of conferences was to permit "the setting of mutually agreed freight rates and conditions of service so that the trade might benefit from the rationalization that co-ordination allows ...". Transportation specialists Sletmo and Williams /94/ distinguish among conferences employing different organizational methods. "Some closed conferences have achieved full rationalization of their services through a careful coordination of sailing schedules, and are generally recognized as being 'strong conferences' with considerable market power" (p. xxx). Such conferences differ from closed conferences without rationalization even when the latter restrict conference members' freedom through "tonnage sharing, allocation of ports to be served, etc." (p. 307). Similarly, a widely cited conference defense by Agman /2, p.

26/ offers no explicit definition of the term but argues

> that rationalization produces higher levels of utilization of scarce resources. Rationalization takes many forms ... however, it is most clearly recognizable by the willingness of national policies to accept the existence of closed conferences and reasonably strong tying devices ..."

A rare example of an explicit definition of rationalization is that by the consulting firm Manalytics /74, p. 1/:[1]

> Rationalization is generally defined as the minimization of the resources required to supply a product or to meet a demand ... we used a special definition of rationalization: to redeploy the liner fleet for reducing fleet size, increasing ship utilization, decreasing operating cost, and reducing fuel consumption, while assuring shippers of adequate capacity and frequency of service to transport the cargoes offered by them. /Emphasis added./

The Manalytics simulation assumed a level of shipping demand in U.S. North Atlantic and Gulf to Northern Europe for 1978. Rationalization was simulated by reducing the number of sailings, the number of port calls, and number of ships while carrying the 1978 tonnage without eliminating service to any port or reducing total fleet capacity (p. 1). A similar exercise by the consulting firm Harbridge House /54, p. IV-33/ refers to rationalization:

> Under conditions of increased cooperation in all trades, capacity rationalization was simulated. This could be achieved through direct conference action to match the number of ships and sailings more closely to demand.

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[1] An earlier paper by Manalytics /75, table 2, p. 4/ distinguishes rationalization agreements, apparently limited to sailings and capacity, from pooling agreements, loyalty agreements, and trade access.

The Harbridge House simulation adjusted the number of conference ships and sailings until each ship carried 95 percent or 100 percent of its capacity for given levels of trade (pp. V-13, VI-12 and VIII-12).

Thus, the term rationalization as applied to liner conference behavior has no consistent definition. Some shipping industry observers interpret the word to mean conference coordination of sailings, port calls, and shipping capacity offered. Other observers apply the term to those supply related matters plus trade accessibility, i.e., existence of closed conferences, the use of cargo and revenue poolings and shipper loyalty agreements.

III. B. U.S. shipping policy vs. rationalization.

U.S. shipping policy has been criticized on many grounds with regard to many issues. To the extent possible the following discussion attempts to examine criticisms that can be related to the issue of rationalization.

A widely expressed criticism of U.S. policy is that the prohibition against closed conferences results in overtonnaging of U.S. liner trades. Capt. J. W. Clark, President of Delta Steamship Lines /17, p. 45/ argues that present policy makes U.S. liner trades a veritable dumping ground for foreign carriers. The same sentiment has been expressed by Charles Hiltzheimer, Chairman of Sea-Land Services /62, p. 61/ and Karl Heinz Sager, Deputy Chairman of the West German shipping firm of Hapag-Lloyd AG /52, p. 102/.

UWIST maritime specialist Davies /28, p. 85/ maintains that U.S. policies inhibit rationalization by preventing conferences from "collectively organizing schedules so as to employ fully the effective and economic tonnage available for meeting shippers' requirements, and from operating the effective ties and pooling arrangements which are necessary if a trade is to be properly serviced and malpractices eliminated." In 1980, Davies published two papers /28, 29/ critical of U.S. policies toward liner conferences.

Transportation economist John Roberts /87, p. 43/ concludes that "an open cartel cannot ... be expected to be able to achieve any significant rationalization because new entrants will constantly be attracted by the resultant profits." Sletmo and Williams /94, p. 302/ complain that the "inability ... to pursue a policy of exclusion has resulted in inefficient use of vessels (in U.S. trades)." Even an outspoken critic of liner conferences, British economist Alan Walters /62, p. 111/, contends that U.S. open conferences have:

> the worst aspect of competition and monopoly and the benefits of neither. Freedom of entry will ensure that all firms in the cartel will tend to operate at too low a level. There will be much excess capacity and too many sailings.

Unlike the other critics, Walter's policy remedy is not to exempt conferences from antitrust prosecution but to eliminate present exemptions.[1] Similarly, U.S. industrial organization economist F. M. Scherer, an advocate of competition, argues /89, pp. 231-232/ that "a perfect cartel -- i.e., one that embodies output controls and other rationalization measures -- performs better than an imperfect cartel that only fixes prices ... of which the ultimate consequence is a high-cost, high-price equilibrium." The same conclusion is reached in a pro-competition paper by Devanney et al. /32, p. 162/. Finally, even the U.S. Department of Justice /107, p. 40/ has allowed for the possibility that conference efficiency would be improved by permitting closed conferences which could enforce limits on capacity.

A slightly different version of the overtonnaging argument is that by restricting conference behavior, U.S. policies inhibit rational planning by shipping companies. Agman /2, pp. 27-29/ complains that the worst consequence of U.S. policy is to restrict conference members' ability to coordinate investment decisions.

> Typically in ... non-American trades, shipowners attempt to optimize their multi-million dollar new construction decisions by consulting collectively with shippers and governments concerned ... In the United States, each shipowner must arrive at his own forecast of future demand and his likely share of that market. The inevitable result of this lonely process ... was that capacity far in excess of any current need was built into the trade.

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[1] It should be noted that some economic analyses of cartel behavior argue that all cartels, open or closed, generate tendencies to excess supply. These arguments will be examined below.

Agman goes on to argue that Europeans circumvented U.S. law by forming consortia in order to coordinate investment capacity decisions. A skeptic might question that interpretation. Shipping consortia are also formed in non-U.S. trades which could indicate that even closed conferences are unable to reach agreement on difficult capacity limiting decisions. Such limitations may only be accomplished through some unified ownership such as consortia, joint ventures, and mergers.

Very similar concerns about the ability to make investment decisions have been expressed by Chase Manhattan Bank shipping economist Peter Douglas /62, pp. 56-57/. He notes that predictions of world shipping tonnage indicate a protracted period of excess supply. In spite of that prediction he reported that his bank financed construction of new foreign-flag liner vessels to be operated in "stable" non-U.S. conferences. He expressed doubt about the opportunities for new tonnage among U.S.-flag liner vessel operators because of the lack of "stability" in U.S. trades. It should be noted that since 1978 when Mr. Douglas offered that view, almost every U.S.-flag liner company had financed new liner tonnage.

Professors Sletmo and Williams /94, pp. 299-303/ also support the view that only by eliminating U.S. policies restricting conference operation can U.S. liner trades become efficient and plan for appropriate capacity. Washington attorney J. P. Meade /81, pp. 410-411/ suggests that investment decisions in the liner shipping company are sufficiently unique that U.S. policy should not weaken the conference system. Swedish shipping executive Von Sydow /100/ also supports liner conferences as mechanisms to control shipping investment. He, as did Agman, notes the frequent use of joint ownership, by consortia, as a means of managing shipping investment.

Critics of U.S. policy often point out that U.S. shipping laws do not expressly prohibit rationalization. Agman /2, pp. 26-27/ observes that limited rationalization does exist in U.S. trades but that FMC regulation "results in many issues having to be decided on a case-by-case basis as measured against the overall best interests of United States commerce and the procedure becomes a drawn out process which works to the detriment of rationality in planning and operation." Sletmo and Williams /94, pp. 304-305/ see exactly the same difficulties, citing examples of the North Atlantic pool and a proposed European consortium. The Senate Commerce Committee report concludes /106, p. 7/ that the development of U.S. shipping policy has had a "'chilling effect' on the efforts of carriers cooperatively to arrive at rational commercial arrangements to improve U.S.-flag participation in our liner trades, increase operational efficiency, and promote comity with our trading partners."

U.K./New Zealand trade and found discrepancies between rates on refrigerated commodities shipped to New Zealand and Australia. Rates to New Zealand were lower than those on similar commodities shipped from Australia, the committee was convinced, because of rationalized cargo arrangements and shipping schedules in the New Zealand trade.

Deakin and Seward /31/ examined the conferences covering United Kingdom, European and Australian trades in some detail particularly for the period 1958-1968. For example, they report vessel load factors measured in several ways over that period. When measured by the percentage of cubic feet of space utilized of space offered for loaded vessels, the average load factors for both legs ranged from 89.5 to 95.4 percent /31, p. 165/; for all British line vessels sailing, load factors, averaged over both voyage legs, ranged from 86.3 to 92.5 percent /31, p. 174/. When British line conference members' total capital utilization (= time utilization x vessel load factor) were compared with other United Kingdom industry utilization, shipping capital was utilized only slightly less than other industries' capital (pp. 174-175): for the years 1958 -- 83.1 percent for shipping versus 89.6 percent for 19 U.K. industies; 1961 -- 83.6 percent for shipping versus 94.3 percent; 1965 -- 87.2 percent for shipping versus 97.5 percent; and 1968 -- 91.4 percent for shipping versus 94.8 percent. Deakin and Seward /31, pp. 66-67/ report that under pressure from the Australian government to rationalize their service, U.K.-Continent/Australian conferences formed a revenue pool in 1966.[1]

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[1] Sletmo and Williams /94, pp. 184-281/ discuss the so-called Westerman Exercise in which the Australian Department of Trade and Industry simulated Australian liner trade for 1963-64 data. The simulation indicated potential savings from rationalization of 17.8 percent in total vessel days, possible savings of 6.2 million on freight revenues of 52 million, a reduction in replacement value of capital used from 155 million to 140 million, and potential general freight rate reductions of 11.9 percent.

The results of that effort at rationalization might be reflected in modest improvement in already high load factors after 1966. Also reported by Deakin and Seward /31, pp. 186-187/ are the financial results for the Europe-Australia Conference Group for the period 1957-1968. For the years 1960-1965, preceding the revenue pooling agreement, average replacement value of capital used by the conference was 161.49 million -- 168.84 million during 1963-65 -- as compared with 161.41 million during 1966-68 following the agreement. Thus, rationalization may account for a modest reduction in capital employed. It should be noted that other factors such as general economic conditions and the Vietnam War may have affected Australian shipping as well. In addition to capital employed, bill-of-lading-tons-carried averaged 3.79 million for the years 1960-65 -- 3.93 million for 1963-65 -- compared with 3.65 million tons for the years 1966-68. Again, perhaps rationalization resulted in less capital employed moving fewer tons of cargo. Average realized freight rates for the years 1963-1965 increased from 14.85 per ton to 15.40 per ton, and in the post-rationalization period they increased from 15.44 per ton in 1960 to 19.62 per ton in 1968. Without examining all the factors affecting European-Australian trade, of course, changes in realized freight rates cannot be solely attributed to changes in conference organization.

A study by the maritime consulting firm of E. G. Frankel, Inc. /47, p. 48/ of U.S./Brazil and Argentina liner trade also provides some limited evidence of the effect of rationalization agreements. These particular trades are almost unique among U.S. liner services because of intergovernment bilateral shipping agreements which provide for revenue pools by the conferences covering them. The Frankel study reports service frequencies of liner operators on the South American routes. For example, Moore-McCormack Lines (Mooremac) reduced its sailings from 46-49 per year in 1979 and 1980 to

36 sailings in 1981. Frankel cites this reduction as evidence of attempts at rationalizaton /47, p. 48/. The study also reports vessel utilization /47, pp. 57-58/. In its U.S. Atlantic/Brazil and Argentina service Mooremac had estimated load factors of 87 percent northbound and 55 percent southbound in 1981. These compare with northbound load factors of 39 to 53 percent and southbound load factors of 24 to 50 percent for the foreign-flag conference members. In the U.S. Gulf/Brazil and Argentina service Delta Lines had estimated load factors of 63 percent northbound and 35 percent southbound compared to 23 to 43 percent northbound and 59 to 65 percent southbound for foreign-flag conference members. Here again rationalization efforts are only one among many factors affecting trade levels and vessel utilization.

In addition to the two mentioned studies of actual liner trades, proponents of liner conferences have performed several simulations of the effect of rationalization on liner shipping. One widely quoted simulation was undertaken by the German shipping firm Hapag-Lloyd /52/.[1] For the North Atlantic container trade in 1975, seven major shipping lines operated 36 vessels making 76 weekly calls. The Hapag-Lloyd study, apparently assuming new, optimum sized ships, found that 16 vessels making 33 weekly sailings could carry the same volume of trade while increasing vessel utilization from 68 to 85 percent and reducing estimated costs by 27.6 percent, from $990 per TEU to $717 per TEU. The rationalization would also have reduced the number of ports served from 21 to 15. An FMC trade study /112, p. 58/ reports 1978 capacity utilization levels of 65 to 96 percent eastbound and 60 to 87 percent westbound.

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[1] The actual study was not available to the author but it is discussed in four available citations: Roberts /87/; Scherer /89/; Sletmo and Williams /94/; and FMC /112/.

Harbridge House, Inc., another consulting firm, simulated U.S. liner trade in Latin America, the Mediterranean, and the North Atlantic under a variety of assumptions. As noted above, the study defined rationalization as changing the number of ships serving a static trade -- or not changing the number of ships in an expanding trade -- until load factors of 95 to 100 percent were achieved. For the Latin American trade, which as the study notes /54, pp. V-14, -15/ is "already rationalized", a U.S. policy of permitting rationalization would result in no improvement in voyage profit or loss. In the Mediterranean /54, p. VI-14/, voyage profit improved for all carriers -- except one group of containership operators -- under rationalization. Similarly, in the North Atlantic /54, pp. VII-14, -15/ rationalization improved voyage profit for six simulated operators but fell for the fleet balance, over the period 1977-1986. Among U.S. carriers, the Harbridge House simulation predicts /54, pp. VIII-1, -22/ that rationalization will improve the profitability of all types of operators in all trades except Latin America. With regard to vessel investment, the Harbridge study predicts /54, p. IX-5/ that rationalization would lead U.S.-flag operators to invest in 11 new ships with a capacity of 13,281 TEUs over the period 1977 to 1986, compared with four new ships with a capacity of 6,000 TEUs under current policy. The increased investment in ships would result from improved profitability. In summary, the study predicts /54, p. IX-7/ that, except in Latin America where little change would be expected, rationalization would result in rate reductions, capacity reductions in the short term and increases in the long term, and reduced but stabilized service frequencies. The simulation model itself /54, pp. IV-1, -34/ treats cost structure, market shares, trade volumes, and freight rates as exogenously determined factors. The intermediate results of the simulation are not reported, only profit or loss results.

Another simulation of liner services on U.S. Atlantic and Gulf ports to Northern Europe was done by Manalytics, Inc. Manalytics defined /74, p. 1/ limited rationalization as adjustment of number of ports served and the total annual fleet capacity. Unlimited rationalization was defined /74, p. 2/ to permit reduction of ports served and fleet capacity while moving actual cargoes offered for all port pairs with a minimum of 40,000 annual tons of cargo. For 1978 combined Atlantic and Gulf service, the Manalytics simulated rationalization /74, p. 5/ resulted in a 42 percent reduction in port calls, a reduction of 100 ships (56 percent), a 46 percent reduction in ship capacity, a 24 percent reduction in the number of round trip voyages, a seven percent reduction in average round trip distance, a 25 percent reduction in total round trip ton-miles, and a 27 percent reduction in costs. Rationalized service would permit reduced speeds which, in turn, would result in a $41 million savings in fuel costs /74, pp. 14-15/. Manalytics /74, p. 16/ concludes that with unlimited rationalization, "one-ship operating entity may offer service between most port pairs ..." With limited rationalization, the study concludes /74, p. 2/ that only modest reductions in total cargo movements could be realized and "that the existing liner service provided by conference and independent shipping lines is relatively efficient," given the existing capacity and port services.

A study /120/ of possible fuel economies accomplished by rationalization of the North Atlantic container services indicated potential annual savings of $30 million. A rationalized service that permitted fewer port calls and slower steaming was shown to have reduced fuel consumption by 50 percent in 1974-75 at prevailing fuel prices.

Predicted Benefits of Rationalization

Trade Routes	Study and Predicted Results
Latin America	Harbridge House: no improvement
Mediterranean	Harbridge House: improved voyage profit for U.S. carriers at 95-100 percent load factors
North Atlantic	Harbridge House: improved voyage profit for U.S. carriers
	Manalytics (unlimited rationalization): 42 percent reduction in port calls, 100 fewer ships, 46 percent reduction in ship capacity, 25 percent reduction in round trip ton-miles, and 27 percent reduction in total operating costs
	Webb Institute: $30 million annual savings in fuel costs

III. D. Arguments against rationalization.

The literature discussed above is basically in sympathy with the argument that rationalization by liner conferences is beneficial. There is also a body of literature that questions such a conclusion. British economists Bennathan and Walters /9, pp. 102, 108/ argue that rationalization in the form of sailing allocations leads conference members to use "smaller and perhaps faster ships than would be the case without conferences." Rationalization agreements concerning sailing rights, cargo quotas, ports served, and limitations on the use of chartered vessels serve to limit the mobility of ships and, in their view, lead to continuation of services that otherwise would be reduced. The implication is that devices usually interpreted as rationalization mechanisms contribute to excess capacity.

Elliot Seiden of the U.S. Department of Justice /62, p. 43/ argues that shipping conferences despite calls for rationalization actually provide incentives for service competition and overtonnaging. Law professor George Garvey /50, p. 2/ maintains that enhanced ability to rationalize also means "monopolistic rates and aggressive exclusionary practices."

There are a few empirical studies of liner shipping that raise doubts regarding the benefits of conference rationalization efforts. For example, a 1978 study by Booz, Allen and Hamilton, Inc. /11/ specifically examined the differences in ocean freight rates between U.S. imports and exports. As a part of this investigation of freight rates, the study reports /11, pp. V-7, -8, -25/ vessel utilizations for U.S., Japanese, and combined flag lines. For example, between 1969 and 1974 on the heavy, inbound leg, Japanese lines had utilization levels as high as 95 or 96 percent in 1970 and 1971, which fell to about 70 percent in 1974. These rates are for the Japanese lines which were rationalized by forming consortia on orders of the Japanese

government (MITI) in the early 1960s.[1] Competing U.S. lines, Sea-Land and P.F.E.L., operating on trade route 29 for the periods 1971-75 and 1968-74, respectively, had utilization rates on their heavy, outbound legs of 90 and 89 percent. On the North Atlantic, U.S. carriers -- American Export Lines, Sea-Land, and U.S.L. -- had utilization rates for the middle 1970s as high as 86 to 91 percent. The implications are that i) U.S. carriers are not necessarily disadvantaged relative to their foreign competitors which presumably have greater ability to rationalilze their services and ii) vessel utilization rates in U.S. trades are not necessarily low.

In a study of Australian liner utilization, Zerby and Conlon /124, pp. 39-43/ found that for 11 modern containerships of the Australia-Europe conference, average load factors for 1974-75 were 66.4 percent on the outbound from Europe leg and 60.7 percent on the inbound leg. Their conclusion is that the excess capacity that is evident, even in the rationalized Australian trade, is endemic in liner shipping because of the fluctuation in the demand for liner services.

For the liner trade between U.S. Atlantic and Gulf ports and the west coast of South America, the simulation by Devanney et al. /32, p. 176/ of a cost-minimizing fleet concludes that inefficiencies attributable to the existing conference operations cost $40 million annually. The optimal fleet would operate eight ships of 2 million cubic foot bale capacity steaming at 14 knots. At the time, the trade was served by 25 ships with average bale capacity between 450,000 and about 1 million cubic feet steaming at average speeds of 16.5 to 20 knots. The simulated required freight rate was $51.50 per ton as compared with average tariff rates of $82 per ton. A review of the

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1 See GAO /114, App. II/ for a discussion of the formation of Japanese and British consortia.

Devanney study by Sletmo and Williams /94, p. 304/ argues that the MIT simulation, in fact, makes the case for rationalization, which is true. The difference between the conclusions of Devanney et al. and Sletmo and Williams regarding liner shipping is that the former argue for rationalization by means of a competitive, market solution and the latter by an effective cartel solution. The MIT group's conclusion is that the competitive solution is to be preferred and that shipping conferences cannot achieve rationalization.

The last section of the review examined the issue of conference efforts at rationalization of liner services. The term rationalization is applied in the literature to mean anything from simply a coordination of sailings and port calls through the full array of practices of pooling agreements and control of access to liner trades that are associated with closed conferences. Most of the work reviewed made note that U.S. policy does not expressly prohibit rationalization, but industry observers representing a wide diversity of viewpoints argue that the U.S. policy of open conferences is the worst policy choice among the available alternatives. Much of the criticism of U.S. policy is directed at the very narrow view of the U.S. Department of Justice concerning the exemptions afforded liner conferences under the Shipping Act of 1916.

Regarding the potential benefits of rationalization, proponents of liner conferences argue that rationalization results in improved efficiency, lower costs, and stability in liner trades. Available empirical evidence provides very limited support for this position. Critics of liner conferences respond with the argument that conference efforts at rationalization actually provide incentives for excess capacity. The limited empirical evidence indicates that closed conferences, presumably using rationalization practices, are neither necessary nor sufficient for high vessel utilization, which is a requirement for low per unit shipping costs.

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