ECONOMICS AND INTERNATIONAL LINER SERVICES[1]

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The object of this paper is to discuss some of the problems involved in trying to integrate the pricing practices of international liner services into a theoretical model. My concern is with liner services provided by shipping lines operating within the limitations imposed by a conference which controls the trade concerned. Conferences are controlling bodies, appointed by and from the liner owners themselves, under the control of the owners concerned and in turn controlling them in their operations in a trade. Usually a conference covers only one trade and consists of several lines. Any line may be a member of a number of conferences, each covering a different trade. Conferences must not be thought of as actually controlling lines: what they do is to control most aspects of the competitive actions of lines within individual trades.

The elimination of price competition within a trade is one of the main objects of a conference. The other principal object is to prevent the entry of other ships in competition. The first object is secured by setting a scale of freight charges and outlawing reductions by member lines on any of those rates, the second by the device of loyalty contracts under which shippers are granted preferential rates if they refrain from using non-conference competition.

The arrangements to fulfil these two objectives are fundamental to the organisation and operation of conferences. Other aspects of conference organisation are relevant to the pricing problem. There are usually clauses in conference agreements fixing the frequencies of sailing by ships in the trade concerned, and perhaps even going so far as to lay down a maximum size for the vessels. Cargo quotas may be provided, with penalties for over-carrying, or there may be pooling of cargo earnings or sharing of profits. The rates set are rarely for the movement of cargo from A to Z; they are normally for movement from A to ports in the range T to Z, or for

[1]This paper is a lineal descendant of a lecture delivered at the Handelshögskolan I Stockholm in March 1964. As presented, the lecture contained an error in argument which was pointed out in the discussion following the lecture. Eliminating the error proved difficult and required substantial changes in presentation and terminology, so that the relationship of the finished paper to the original lecture is probably apparent only to the author. I am grateful to the trustees of the Marcus Wallenbergs Fund for making the journey to Stockholm possible and providing me with an opportunity of presenting my ideas to a keen and critical audience and thereby discovering the inadequacies of those ideas.

The first draft of this paper was written in late 1963. The necessary revision after the Stockholm visit began in mid-1964 and when almost complete had to be put aside in favour of more urgent matters. The present text was completed in 1965, and therefore does not take account of any work published since then. Alterations made subsequently have consisted of purely verbal changes and the insertion of footnotes.

movement from the range *A* to *F* to the range *T* to *Z*. These ranges may be very wide in the geographical sense and may include ports widely different in type, with substantial differences in costs and significantly different distances from the port at which the journey began.

It is not intended in this paper to discourse on the virtues and vices of the conference system. Here we are only concerned with conferences because they represent the organisational framework of international liner services.

The subjects of special concern in this paper are as follows. Both arise from the organisational framework provided by the conference system.

1. Why have conferences?
2. Can conference price fixing be understood in terms of micro-economic profit maximizing theory?

WHY HAVE CONFERENCES?

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."[2] In brief, the argument is that marginal cost is very low, about 20 per cent of total cost. This means that it pays a shipowner to carry a ton of cargo rather than sail with empty space, provided the rate on that cargo exceeds 20 per cent of the rate which will cover "full costs".[3] It is argued that with such a cost structure the effects of price competition would be for prices to be forced down to the lowest level, at which no one could make a living. If price competition is not restrained the situation is unstable, the instability being so great that no one will take the risks of committing capital to the provision of regular liner services. This is a plausible argument which appears to be supported by analogy from the experience of other industries with similar cost structures. Nevertheless, it cannot be accepted as an adequate explanation.

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. For a fully laden ship, these costs might typically average about 20 per cent of total costs. For any individual ton of cargo the relative importance of handling and other costs will vary widely from the average according to the route, the type of cargo, the amount loaded at the port where the ton is taken and many other factors. If the ship is less than fully laden, the handling charges fall as a percentage of total costs, obviously reaching zero when a ship sails empty. This concept of marginal cost as being equal only to handling charges is relevant when one is discussing the formation of rates within a rate schedule. The error has been to assume that the same concept of marginal cost applies to consideration of the minimum rate at which an extra ton of cargo will be carried.

So long as ships are tied to a schedule which calls for departures at precise times, the usual concept of marginal cost is valid for all purposes. Thus it probably applies

[2]Sturmey, *British Shipping and World Competition*. Athlone Press, London, 1962, page 323.

[3]"Full costs" appears in inverted commas because it is not possible to calculate the full cost of carrying one ton of cargo.

to such vessels as mail liners, cross-channel steamers and train ferries. But the ordinary cargo liner has some flexibility of operation; she can sail early if the cargo is all loaded, she can sail later if more cargo is to come. She may be somewhat constrained by tides at the port of loading, but there is still considerable flexibility.[4] Once *any* flexibility is introduced, the marginal cost of an extra ton of cargo ceases to be simply the handling charges. The shipowner has to choose between the alternatives of sailing and waiting to load the cargo. The marginal cost of that ton of cargo is then the handling charges plus the cost of the ship's time spent in handling it. This cannot be pushed to its extreme position because ships have obviously to spend some time in port bunkering, taking on stores, and so on, and any cargo loaded in that period has marginal costs at the lower level. When coal was the predominant fuel, bunkering was such a slow process that it probably occupied most of the time a vessel was in port anyway. If the ship has to spend the day in port bunkering, the temptation to cut rates to secure cargo for loading during that day is very great. One of the original functions of the conference was to provide sanctions such that the shipowner would resist the temptation. With the use of oil, this has changed. For most ships, most of the time, the marginal cost of an extra ton of cargo substantially exceeds handling charges, because it is cargo handling time, not bunkering time, which determines the length of the stay in port. The consideration of costs in these terms cuts across the variable cost/fixed cost division as usually stated. The critical division is between port time and sea time. All cost items for the time a ship spends in port can enter into marginal cost; no cost items for sea time can enter marginal cost. The division of total costs between those incurred in port and those incurred at sea is of the order of 60 : 40 for most cargo liners. On short sea trades these proportions may be 80 : 20 or even 90 : 10.[5]

The important cost division is not between categories like handling charges, fuel and depreciation, but between costs in port and costs at sea. These divisions must, however, be modified in one respect. If a ship waits to load extra cargo and then has to speed up to arrive at the next port at the appropriate time, the marginal cost of taking that extra cargo is the handling cost of the cargo plus either the cost of the extra speed or the cost of the ship's time spent handling the extra cargo, whichever is the greater.

The redefinition of the cost categories into more meaningful divisions reveals that, if the cost structure were the main reason for the existence of conferences, the need for conferences would vary directly with the length of the voyage. For a short voyage, port time costs are high in relation to sea time costs and bunkering can be postponed.

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[4]Tides are usually important when the ship is berthed a distance from the open sea. Even if the tide constraint appears absolute and the ship must sail at, say, 4.31, there is still the choice, for example, between battening down before leaving the wharf or while going down the river; or, of course, the ship can wait for the next tide.

[5]The cost division between port time and sea time provides a weak argument in favour of the use of a uniform blanket tariff covering a range of widely separated ports. The argument is a weak one because (a) the difference in sea time between the nearest and furthest port is often large; (b) port efficiencies, and hence direct handling costs per ton of cargo and time taken to handle each ton, differ markedly between ports; and (c) the addition to costs of calling at a port with 400 tons instead of 200 tons of cargo is less significant than the addition to costs involved in making the call as compared with omitting the call.

Marginal cost is, therefore, high in relation to total cost, and the problem of probable rate cutting is a minor one. For a long voyage, port time costs are smaller in relation to sea time costs and bunkering cannot be postponed. Marginal cost is, therefore, relatively low and the rate-cutting problem greater. Although conferences originated in long-haul trades, this historical fact does not prove the structural argument for conferences. If conference trades are examined it is found that at any one time some conferences are, as it were, freewheeling and not imposing any controls. If the cost structure argument were valid, freewheeling conferences would predominantly cover short sea routes. In fact they do not, and the decisions to allow freedom to some trades, at some times, cannot be understood in these terms.

The cost structure argument also suggests that conferences are less necessary for ports where only small volumes of cargo are handled by each ship than for ports where larger volumes are available. In practice it is found that liners zealously guard their rights to incur marginal costs in excess of marginal revenues by sending large ships to ports out of their way to collect small shipments. Rate cutting on cargoes to and from such ports would make the whole exercise obviously ridiculous, and so conference control is made tighter, not looser. The practice is then the exact opposite of the conclusion of the cost structure hypothesis.

If the cost structure argument is rejected, is there anything to put in its place?

The substitute argument, for which validity is claimed, is double barrelled. The first part of the argument is that the peculiar susceptibility of liners to rate cutting arises from the structure of the freight rate schedules. These are compiled with little regard to the actual costs of handling and carriage of the particular goods concerned. It would seem that the rate on any item might logically be composed of one constituent based on the time-cost of the ship's space occupied and another based on loadability. In practice, what the cargo will bear, bargaining between shippers and conferences, and accident are more important determinants of the individual rates than costs of carriage and handling. The arbitrary nature of the schedule and the lack of any defined relation between cost and charge provides the scope for selective rate cutting.

At this point it is necessary to define several different types of rates. Frequently discussion is in terms of highly-rated and lowly-rated cargo, these terms referring to the margin which exists between the rate on the cargo and the direct costs involved in its carriage. This division is too crude for our present purposes. Let us define rates in the following way:

Alpha rates:	rates which, if the ship was fully loaded with such cargo, would yield "normal" profits or better to the shipowner, and where sufficient cargo of the type is available to prevent the idea of full loads from being patently ridiculous;
Beta rates:	rates which, as above, would cover costs but yield less than "normal" profits to the shipowner, and where cargo is available as above;
Gamma rates:	alpha or beta type rates where cargo volume never amounts to a shipload;
Delta rates:	rates which would cover direct costs, but not total costs, irrespective of amount available;

Delta rates: rates which would cover the total costs of a casual entrant to the trade when sufficient cargo volume is available, the entrant not necessarily using a different type of ship or organisation from that of the liner owner;

Epsilon rates: rates at which the shipowner would have been better off if he had not carried the cargo;

Epsilon rates: rates at which a ship such as a tramp or bulk carrier can add more to revenue than to costs by carrying available cargo.

Consider these five rate classes in terms of a conference covering the trade from A to all ports in the range T to Z and using a single rate schedule. This schedule will contain a vast number of rates on different commodities, but without reference to the actual destination. Now it is clear that a rate which is classed alpha from say A to T may be classed as beta to U, either because of the extra steaming time involved or because U is a more expensive port than T. Similarly, the same rate may be a delta rate, or even an epsilon rate, to another port. Again, if the amount of cargo from A to T is small the rate which would be an alpha rate for a larger volume can easily become a gamma rate.

If a shipowner has loaded a lot of cargo at alpha or beta rates, he may be disposed to cut rates on other cargoes to fill up the ship. If a shipowner has loaded a lot of cargo at delta or epsilon rates, he is particularly vulnerable to rate cutting by competing ships on better rated cargo, and at the same time has an incentive to at least shade other people's rates on that cargo. Some cargo at beta or even delta rates is worse than such cargo at alpha rates, but better than none at all. It is usually in the cargoes with alpha or beta rates that rate wars occur; no one fights for the privilege of carrying cargoes at epsilon rates.[6] Where some cargo items are bearing freights which provide a large margin over direct costs, so enabling other cargo with smaller margins to be carried, the risk of a rate war is always present. In a rate war, even if the rates on alpha rated goods do not fall below the delta level, the rate war results in liner owners making losses because they were relying on the carriage of those goods to cover their overheads, and these would not be covered even with full loadings of the delta rated cargoes. Clearly, when no one really knows which rates are which because accurate costing has not been carried out, when the same rate can be an alpha rate to one port but a delta rate to another, and when conferences keep their rate schedules secret, rate wars can have unpredictable effects and can go to extravagant lengths. Excessive rate-cutting arises not from the low level of marginal cost, but from lack of knowledge on the supportable limits for cutting.

The explanation which relies on the structure of rates rather than the structure of costs has the advantage that it can explain both the two main types of rate wars. When a rate war occurs because a line wants to become a permanent member of a

[6]This assumes that the conference is primarily concerned with preventing other liners from cutting rates. In practice the most significant competition may be from non-liners and may concern cargo at *delta* and *epsilon* rates. The interloper may skim the cream, but the cream is then at the bottom, not at the top, of the bottle. There is no reason why the liner owner should worry about losing any cargo at *epsilon* rates (although he may do so because he does not realise that the rate is such that it would have paid not to carry the cargo); but the loss of delta or *delta* rated cargo may be serious, because the liner is then left with a much smaller quantity of better rated cargo, but loses the conribution to overheads made by the delta cargo.

conference, or a line in a conference wants an increased share of the trade, an explanation based on either cost or rate structure is satisfactory. When, however, a rate war is a sniping operation by ships escaping from a shortage of tramp cargoes by trying to capture some liner cargo, the cost structure explanation is of no value. The alternative for such ships is clearly to lay up, so marginal costs[7] are very high: they could easily lose more money by cutting conference rates than by laying up if conference rates bore a regular relation to costs. It is precisely because some rates are in excess of costs that the sniper is given his opportunity. These "loaded" rates can be cut and still yield a profit to the intrusive shipowner; the liner owner suffers because he is left with the cargo which he has agreed to carry, whether knowingly or not, at delta or epsilon rates. It should not be assumed that alpha-rated cargoes and low-volume cargoes are synonymous. A cargo such as bagged wheat, which loads and stows easily, may be highly profitable at what appear to be very low rates if it is available in large quantity. In practice liners may be competing with tramps, rather than the other way round, for the privilege of carrying such cargo.

The second barrel of the argument is over-capacity. It was over-capacity which led to the invention of conferences. Despite what has been said above, marginal cost remains below average cost, and if there is not enough cargo to go round the shipowners will fight for it. Obviously they will not fight to carry cargo at less than variable cost, but they will fight to carry it at less than average total cost. The structure of the freight rate schedule intensifies the over-capacity problem; but, even if all rate schedules were completely rational, the problem would still exist. In the days before radio communication was available, and when the trades in which expensive steamships could find cargo were limited, conferences may have been the only answer to the problem of over-capacity. At the present time, when ships can keep in touch with all ports on their route and avoid those places where cargo is inadequate, when information about world trading conditions can be available continuously in shipping offices, shipowners can largely avoid the effects of localised over-capacity. More correctly, they could do so were it not that they are afraid of losing their berth rights in the conference if they avoid a port where cargo is thin, or if they cut out some sailings in a slack period, and were it not that most alternative trades which they might investigate are tied up by conferences. The result is that a great deal of cargo is carried at gamma rates because too many ships are calling at too many ports too frequently. In a world-wide slump conferences give no protection against price cutting, except in those trades which are held by a single line (or by two or more lines which are associated outside the conference). The conferences then protect mainly the gamma rates, for which the risk of rate cutting would be minimal without the conference.

A case for the conference system can be made out on the basis of arguments about the arbitrariness of the rate structure and the effects of over-capacity. But the case falls to the ground because both the rate structure and the over-capacity are *conse-*

[7]By laying up the liner owner avoids costs of wages, fuel, stores, handling cargo, etc., but continues to incur depreciation, interest charges and the costs of maintaining his organisation. If the ship is not in a suitable place to lay up he has to incur costs to reach a lay-up port. Further, there are unquantifiable costs, such as the loss of berth rights, which lay up may entail. Finally lay up itself has a positive cost. It is all these factors which make marginal cost high.

quences[8] of the conference system. Thus it appears that the main reason why conferences as we know them are needed is that they have created a situation in which they are needed. But it is not logical to make a further extension of the argument to the conclusion that all forms of protective organisation of liner trades are unnecessary.

CAN CONFERENCES MAXIMIZE PROFITS?[9]

Conferences both fix prices and regulate capacity, but they do not, in the technical sense of economic theory, maximize the profits of their member lines considered as a group.

There is a superficial resemblance between a conference with its constituent lines and the model of a perfectly competitive industry with its constituent firms. The industry (conference) has a downward sloping revenue curve; the firm (line) is a price taker with a horizontal revenue curve.[10] In the perfect competition model firms maximize profits, but for the industry the price is lower and output greater than would give maximum profits for the industry. It is conceivable that this situation could exist in the conference. This would imply that the output of each line was determined by its own marginal costs. But this is demonstrably not so. Trade shares are determined by bargaining, not by costs, and low cost lines expand at the expense of the others only by bargaining within the conference.

It may be that in single-nation conferences trade shares are determined by relative costs, and that, therefore, lines do maximize profits. It is not possible to assert definitely that this is not so, because conferences do not reveal the basis on which their trade allocations are made. Nevertheless, it is *a priori* unlikely that trade shares are based on costs in such a way as to maximize liner profits. First, the costs taken into account in determining shares, if costs are taken into account at all, would certainly be average costs and not marginal costs. Second, the stability of the trade shares over time, indicated by sizes of fleets engaged in particular trades, coupled with the variation in profit experience between lines with interests in similar trades, are inconsistent with cost-based shares, but fully consistent with historical or "fair" sharing. The arguments against profit maximization by lines in single-nation conferences are sufficiently strong for us to dismiss the possibility that such maximization occurs.

If liner profits are not maximized when costs differ only because of variations in efficiency, they clearly cannot be maximized where costs would differ even if all lines were equally efficient. It is therefore not possible to sustain the proposition that multi-nation conferences operate to enable each individual line within the conference to maximize profits. The only rational alternative is for the conference to be the maximizer, acting as a monopolist, and for the individual lines to earn what profits

[8]Conferences may not "cause" over-capacity, although the shift in the emphasis of competition from price to service tends to lead to over-capacity. But conferences preserve over-capacity when it is caused by downward fluctuations in demand, since each member resists a cut in his sailings for fear of losing his berth rights.

[9]See also Sturmey, *Some Aspects of Ocean Liner Economics*, Manchester Statistical Society, March 1964, for an earlier argument concerning profit maximization by liner owners.

[10]In the perfect competition model it is a horizontal average revenue curve, whereas in the cartel case it is a sales curve.

they can from their trade allocations within the maximized total. Clearly, the profits of the whole body of lines together would be higher than if each carried out its own maximizing exercise.

Probably without exception, conferences do not maximize profits in the short run. The revenue curve, at the ruling freight rates, is usually inelastic both in total and for individual items within that total. This is the direct consequence of charging what the traffic will bear and keeping freight rates relatively low in relation to the value of the goods carried.

There are two possible explanations of the situation. The first is that conferences are maximizing something other than profit, the second that they are not maximizers at all.

If we are to consider the conference as a maximizing body with a maximand other than profits, there are several choices open. The most plausible line of argument is that conferences are concerned with preserving over the indefinite future the positions of their *present* members. This can be equivalent to saying that they are concerned with maximizing long-run profit in a situation where the long-run revenue curve is not a simple extension of the short-run curve with trade trends taken into account, but makes allowance for the possibilities of competition arising as a consequence of the pricing policy.[11] The pricing policy is, then, that which prevents the occurrence of that competition. Such a pricing policy could be a long-run profit maximizing policy, or it could be a "play safe" one which involves no maximizing. The difference is purely theoretical, for, since the maximizing policy involves a subjective judgment, it is impossible to tell in practice whether the conference is maximizing on a subjective curve or playing safe because it feels less than complete confidence in its views about that curve.

In either event, pricing can only be considered in terms of its deterrent effect. Arguing along maximizing lines, the long-run revenue curve is elastic because at certain prices rivals will enter. This does not imply elasticity for the long-run demand for liner services: it simply says that the long-run revenue curve of the existing conference lines as a body may be elastic. In this sense, deterrent pricing and long-run profit maximization are consistent: but whether any set of deterrent prices is, either in intention or in result, maximizing is another question. Two aspects of the long-run maximizing problem by means of deterrent pricing will be discussed, namely, the concept of deterrent pricing and the use of entry postulates to give elasticity to long-run revenue. One short-run difficulty is also considered, namely, the relation between the structure of a rate schedule and deterrent pricing.

In discussion of the long-run problems "pricing policy" refers to the overall level of rates and takes for granted the structure of a rate schedule containing rates at a variety of different levels. There is little evidence[12] to suggest that conferences pay

[11]Such a policy is better considered in terms of maximizing the net present value of the enterprise than of maximizing long run profits (see W. Fellner, *Competition Among the Few; Reprints of Economic Classics, Augustus Kelly, New York, 1960*).

[12]In a recent example of a rate schedule reconstructed when container ships were introduced on the trade concerned, the complex commodity classification was left unchanged but rates were reduced to five in number. The short rate schedule published is meaningless without access to the detailed commodity classification. But, although not going very far, this example is evidence of attention to the overall structure of rates.

much attention to the overall structure of rates in the sense of asking whether the whole rate schedule is appropriate to the long-run aims of the conference. But they do adjust the schedule in the sense of moving goods between rate classes, providing surcharges for particular ports at which cost increases have occurred, freeing commodities from control for periods, re-imposing controls, and so on. These are essentially short-term matters, although clearly they may have effects in the long term.

Concept of Deterrent Pricing

(i) With zero entry costs

Conferences covering international trades are generally composed of ships of more than one nation. While there is a substantial similarity in the costs of ships of most Western European nations, and American liners are subsidised to keep their outlays to about the same level, costs are not identical. In its pricing policy the conference has to take into account cost differences between members. Deterrent pricing implies that prices are based on the operating costs of potential entrants.

If all potential entrants have higher costs than any line in the conference there is no problem. In such a situation rates could conceivably be at the profit-maximizing point on a curve concerned only with the effects on total demand of changes in rates. If they are, pricing is not deterrent. At any point below this, the overall structure of rates may be yielding more than "normal" profit to the liner owners in the conference, but may still be deterrent in the sense that if they were any higher the overall-high-cost country would be attracted in. Given that almost all conferences contain Western European members, the idea of prices to deter higher cost owners is, empirically, difficult to accept.

Deterrent pricing must be calculated to deter either owners with similar costs or owners with lower costs, or both. In either case this implies that in a conference with lines from different countries the higher cost lines are earning a lower rate of profit than the average for the conference. If they are prepared to remain in the trade in the long run earning such profits, the other lines must be earning more than the minimum necessary to keep them in the trade. In such a situation there is at least a likelihood of new entry, that is, the possibility that rates are non-deterrent. Deterrent pricing where lower cost owners are being deterred almost certainly means relatively low profits for high cost operators in the trade. Why then do they stay in the trade? Transfer earnings are low in the short run but not in the long run. The reason might be that owners are irrational, or that the entry rate of profit is significantly above the exit rate, or that the model is unrealistic. The third possibility is the most likely.

(ii) With positive entry costs

Deterrent pricing is concerned only with the operating costs of competitors so long as costs of entry are zero. The attempts which conferences make to prevent entry, and the fight they put up when entry is attempted, ensure that entry costs are always positive. The relevant costs of the new entrants then become their operating costs plus the amortized entry costs.[13] These must always be uncertain in numerical terms,

[13] "Entry costs" may be borne by shippers, not by shipowners, through the loss of deferred rebates or the future enjoyment of low contract rates as opposed to non-contract rates. This merely means that the new entrant, whether a casual interloper or attempting to establish a regular liner service outside the conference, must cut rates further than would otherwise be necessary to secure cargo.

although precise enough as a theoretical concept, because it can never be known what entry costs a potential competitor would bear, or over how long a period he would be prepared to spread their amortization. This consideration reinforces the difficulty of calculating the precise level of rates which would begin to make the revenue curve elastic. Clearly, entry costs exist and may be substantial.[14] Given positive costs of entry, the deterrent pricing argument looks much more tenable, although the attempt to relate deterrent pricing and profit maximizing becomes more difficult to sustain.[15] The significant difficulty of the deterrent pricing case with entry costs added is that entry does occur. Given that wage and capital costs are similar, but not identical, for most ships owned in Western European countries, the entry of any Western European line into a conference trade dominated by such lines must imply that either the ships or the management of the new entrant are more efficient than those of the lines in possession of the trade by a sufficient margin to offset the costs of entry.[16] This may be the case, but shipowners in possession of trades would certainly not agree. If they are right not to agree, then we are forced back to the position where costs of entry are not taken into account, which means, virtually, to abandoning the idea of deterrent pricing. If the shipowners are wrong it is difficult to see why the lines concerned should ever join the conference. They would be able to undercut conference rates until the conference lines were forced out of business.[17] In practice this rarely happens; the non-casual new entrants settle for a share, and often a minor share, of the trade.

Entry Postulates and the Revenue Curve

The other stumbling block to the acceptance of a maximizing model (with or without deterrence) is the use of postulates about entry to yield a continuous and elastic long-run revenue curve. The idea of infinite adjustments producing continuous curves is both seductive and analytically necessary. Empirically, however, it is nonsense. When new entry occurs it comes in discrete lumps. It is just not true that for

[14]One can make out a good case for the theory that high entry costs were an important element early this century in deterring British lines from expanding by competition, and led them to expand by mergers.

[15]To accept deterrence as a factor in pricing means that we have to reject many of the practical conclusions of the Imperial Shipping Committee on reasons for rate differences. In the New Zealand meat trade, for example, they concluded (Cmd. 1564, 1922) that rates were higher than in the South American meat trade because in the former trade ships had to call at each of several ports to collect a full cargo, whereas in the latter only a single call was needed on each trip. But just such a difference in rates as existed is consistent with deterrent pricing, for entry costs to a competitor would have been higher in the more tightly organised New Zealand trade than in the more open South American trade. The evidence published always looked a bit too thin to fully support the case argued by the Committee.

[16]It is not overlooked that the tenants may rate the costs of entry higher than a new entrant. Entry can then occur, and from the theoretical point of view it makes no odds who was right about the level of costs. Also note that casual entrants, *e.g.* tramps, may have significantly lower costs because they are providing a different type of service.

[17]Only if constant costs are assumed. To compete the conference ships out of the trade requires the provision of sufficient shipping capacity to handle most of the trade *before* the ships in the trade are driven out and available for purchase at relatively low prices. The principle of increasing risk applies to such an investment in capacity: constancy of expected costs does not then obtain.

every minute increase in real rates[18] there is a small increase in the capacity placed in the trade. Rather the position is that a number of increases of, say, one per cent in real rates are followed by no change in the demand facing the lines in possession, until at some point another one per cent increase causes, say, a ten per cent increase in capacity, and so a reduction in demand to the lines in possession, through new entry. It is possible that a notional continuity could be obtained by taking the units of increase in rates of just such a size as leads to new entry. There are two objections to this. The first is that the point at which a rate increase gives rise to new entry is likely to be completely arbitrary. The second is that the continuity of the curve so obtained is fictitious. The length of curve between the two points remains meaningless, because no price or output decisions between the points will yield a result lying on the curve.

It may be that the average revenue curve could be regarded as kinked rather than discontinuous. At all prices below the ruling price the curve is inelastic; hence there is no incentive to investigate such prices. The ruling rates are at the absolute maximum at which new entry is just deterred, so that any increase in rates must lead to new entry. There is no necessity to consider sections of the curve beyond that first price rise: the curve is so elastic that even the first price rise will not occur. There is, then, a short length of determinate *MR* (marginal revenue) curve, and profit maximization becomes theoretically possible. This implies, however, that the *MC* (marginal cost) curve meets the lower end of the segment of the *MR* curve. Is this possible? Long-run *MC* must comprise the whole cost of the carriage of the cargo. Long-run price must equal the whole cost of carriage[19] plus profit at a deterrent rate. But, since normal profit enters into marginal cost in the long run, and deterrent pricing presumably keeps profits from exceeding "normal", it follows that *MC* equals price. We cannot have a situation in which $MC = MR$ and $MC = P$ unless the demand curve is horizontal, which rules out the kinked curve solution unless the elasticity above the kink is assumed to be infinite. Such an assumption is empirically untenable.[20]

Deterrent Pricing and the Rate Schedule

Any rate schedule is highly complex. What the conference tries to do is to secure perfect discrimination between different cargo items, taking into account the elasticity of demand for the commodity in the market and the value of the commodity. The overall level of rates is based on cost, but individual rates are not; indeed, it is doubtful whether the rate fixers have very much idea of individual costs. At its best, the rate schedule could be a highly sophisticated exercise in short-run price discrimination; at the worst it is an arbitrary collection of rates formulated over time on the basis of purely qualitative judgments. To the complexity of the commodity classification is added the extreme simplification of the blanket rate from a range of ports,

[18]The switch to real rates at this point in the argument allows us to ignore those increases based on rising costs which are likely to, but need not, affect also the costs of potential entrants. Strictly, we are concerned with rate increases which would represent real increases to potential entrants, whatever they represented for the lines in possession.

[19]Not for any individual cargo item: that is ruled out by the conferences' methods of rate fixing. Only some idea of an average ton of cargo is empirically tenable.

[20]But the *sales curve* may have infinite elasticity, as argued above.

destroying much of the *raison d'etre* of the commodity classification. The fact that port classification could readily be based on costs, whereas commodity classification can only be so based with difficulty, is a clear indication that the conferences are not using a cost basis for their short-run rate determination.

The overall result is a hotchpotch. Consider again the conference covering the route from A to ports in the range T to Z. A particular rate to T may be an alpha rate on a cost basis; the rate to Z for the same commodity might be a delta rate on a cost basis. This *could* be rational, provided the elasticities of demand were just such as to justify the discrimination of charging the same rate where costs were different. But it is asking a great deal to believe that such a situation exists except by absolute chance. The real result in practice is that the sophisticated exercise in discrimination, by charging different rates for commodities for which costs may be the same, is completely negated by the discrimination of charging the same rate for ports at which costs are different. Can we believe that the elasticity of demand for all goods in all European countries is the same?

The rate schedule has weaknesses as a device to cover all costs, possesses an internal inconsistency as a means of carrying out discrimination for profit maximizing and does not provide an adequate short-run deterrent to entry.

The rate for a commodity may be an alpha rate from A to T and an epsilon rate from A to W because the volume of cargo moving from A to W is so small that the liner owner would have been better off if he had not carried the cargo and so omitted the call at W. Any alpha rate is, by definition, non-deterrent. The very structure of the rate schedule opens the conferences to competition from new entrants. Alpha rates are a constant temptation to tramps, bulk carriers and non-conference liners. Beta rates are similarly attractive. A non-conference liner may fight at beta rates and be prepared to join the conference to see these restored to the alpha level. The fact that new entrants accept conference membership when it is offered is no proof of the value of conferences, but only proof of the attractiveness of the alpha rates, together with the increasing risk involved with each additional commitment of resources in any attempt to beat the conference. Gamma rates provide a temptation to any ship on berth, but not to outsiders. But a rate which is a gamma rate at one time of the year may well be an alpha rate at other times of the year. Even the delta and epsilon rates may be non-deterrent, that is, may be *delta* and *epsilon* in practice, for some periods or to some ports.

A purely cost-based rate schedule, with a complex port classification and a simple blanket commodity classification, could be deterrent in the long run. In the short run such a structure might not be fully deterrent, but the deterrent effect would be greater than that of the present structure. The point about the present rate structure is that it requires an elaborate system by which entry costs are raised in order to preserve its deterrence. At the same time, there are periods during each year, or there are commodities, for which the whole operation is too difficult, and these are freed from control. In this way the liner can often undercut the tramp without pushing rates down to the delta level, simply because it is providing a different service. The important difference here is that the liner will carry from A only to a predetermined port in the range T to Z, but at the same rate for whichever port is predetermined. The tramp will carry from A to any port in the range T to Z. The flexibility of the tramp is more expensive (it costs less, *ceteris paribus*, to carry to a nearer

port than to a more distant one, and the tramp owner has to consider that his ship may be sent to Z), but is beneficial to the shipper, as it enables him to play the market while the cargo is at sea.

CONCLUSION

The attempt to find an acceptable basis for a maximization theory of conference pricing has not succeeded. The only possible basis for a maximizing theory is a subjective maximand. If one argues that conferences are rational, therefore they must be maximizers, therefore whatever they do is maximizing something, one can construct a maximizing theory. The limitations of such an approach are obvious.

If the strict concept of maximization is abandoned, a determinate theory of conference pricing is impossible. But an explanation of conference pricing policy remains possible. It has been seen that conferences do not attempt to maximize short-run profits. A perfectly sensible explanation is that, if they pitched all freight rates to the level necessary to do this, in the long run this would attract competitors who could cut rates to such an extent that the traditional weapons of the conference for retaining its customers would be ineffective. Pricing is, therefore, determined on a basis which will yield reasonable profits to the lines in the trade but will not attract extra competition. The rates determined in this way do not guarantee a profit to all lines. First, they are based on some concept, even if only implicit, of breakeven, so that when the volume of cargo coming forward is lower shipowners operate unprofitably. Second, they must assume some mixture of alpha, beta and delta rated cargoes; and if the mixture changes in favour of delta rated cargoes profits will fall. Third, the costs of ships of different nationalities may change in different ways: at the best the rates are a compromise designed to suit the needs of lines with differing costs. Clearly, the lines with higher costs are always more vulnerable than those with lower costs.

The weakness in the position arises from the arbitrary structure of rates. Rate making may be intended to be deterrent in the long run, but the existence of discriminatory pricing means that in the short run some rates are non-deterrent while others, taken on their own, are deterrent even to the lines in possession. In a boom, when ships not engaged in regular liner trades can make money in the tramp market, these non-deterrent rates have little attractive force. In a "normal" period, that is, a time when tramp rates are profitable but not booming, the attractive force of the non-deterrent rates is weak unless there is the possibility of high loadings of such cargoes. If an owner can see a chance of getting, say, half a shipload of one cargo by shading the conference rate he is likely to do so, and will then be prepared to cut other rates to fill up his ship. In a slump, when tramps are not covering their depreciation, the presence of non-deterrent rates is a constant temptation to shipowners outside the conference trades.

The rate structure produces another serious weakness. Changing cargo composition alters the profitability of the conference lines. An increase in the flow of some cargoes raises gamma rates to the beta or even alpha level, so increasing profits and attracting outside competition, even though the increase in some cargo is matched by a decline in other types. The conferences appear not always to appreciate this.

They see their basic rate structure unchanged and their volume of cargo constant. When outsiders attempt to enter the trade the conferences argue that the needs of the trade are being adequately served, that extra tonnage will mean excess capacity and that rates will have to be raised to cover the costs of this. Thus the main point is missed completely.

To sum up: Conference rate making cannot be explained in terms of maximization, partly because deterrent pricing and maximizing pricing are incompatible, partly because of the lumpy nature of entry and the uncertainty regarding the costs of entry. The idea of deterrent pricing appears to be acceptable as a long-run explanation of conference behaviour, and, in terms of the long-run survival and profitability of member lines, is rational. But the arbitrary nature of the rate schedule and the blanketing of ports destroy much of the deterrent effect of the overall pricing policy. The attempts by the conferences to restrict freedom of entry are largely attempts to counter this short-run weakness.

None of this would be necessary if rate-making were deterrent in the short run and in the long run, that is, if all rates were based on costs of carriage plus a normal profit. Many traders would argue that such rates would serve the needs of trade less well: in terms of overall resource allocation they would serve those needs much better.

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