PREDATORY BEHAVIOR IN THE PASSENGER TRANSPORT INDUSTRY

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ABSTRACT

This paper provides a survey of the identification of predatory behavior in the bus and airline industries. Such behavior may include predatory price cutting, frequency increases, or schedule matching. We consider the rule-of-reason approach used by the Office of Fair Trading to investigate allegations in the deregulated British bus industry, and the alternative Economic Modelling Approach which we have developed. The latter approach requires a model of competitive equilibrium to determine whether the actions of the incumbent have converted a profitable entry opportunity into a negative one. There have been few formal investigations of predation in the airline industry, but the paper reviews the evidence both from the United States and from Europe, and concludes that safeguards against such actions are a necessary part of competition policy in the industry.

1. PREDATION

This paper is concerned with what might be termed a paradox in the analysis of deregulated transport markets. This paradox is that, after barriers to entry have been removed in order to promote competition, firms in the industry who respond to competitive entry may find themselves accused of anti-competitive behavior by regulatory bodies. While governments have encouraged the breakdown of established regulatory barriers to entry, and argued that established and previously-protected firms should be subject to market forces, the “rules of the game” seem to outlaw some actions that existing firms might adopt in responding to such market forces. Alfred Kahn has coined the phrase “deregulatory schizophrenia” to describe this phenomenon (Kahn, 1987).

One example of an anti-competitive action is predatory behavior. This paper aims to survey the attitudes and responses to predatory actions, both in the deregulated (or liberalized) airline industry and in the deregulated UK bus industry. In doing so, we draw on the various published investigations of alleged predatory behavior in the UK bus industry since deregulation, and on our own work on the investigation of predatory behavior in the airline industry and in the bus industry.

There are a number of definitions of predatory behavior. Early work on predatory behavior was concerned with predatory price cutting, but analysis in the passenger transport industry has indicated that predatory behavior may also include predatory increases in capacity and predatory matching of schedules. One definition, which we have adopted ourselves, is that:

Predatory behavior occurs when firms give up some of their maximum current profits after entry into one of their markets has occurred, in order to eliminate the new competitor or deter or delay subsequent entry, so that greater profits can be earned in the longer run.

An alternative, and less strict, definition is that predatory behavior only occurs when incumbents actually make losses after entry in one of their markets has occurred, in order to eliminate the new competitor or deter or delay subsequent entry. In both cases, predatory behavior is consistent with long run profit maximization on the part of the predator.

There is an extensive literature on the question of whether predation can ever be a rational entry-deterring strategy. We have reviewed this literature elsewhere (Dodgson and Katsoulacos, 1988), and believe that the evidence does support the view that predation can be a rational strategy under certain circumstances. This view is confirmed by other recent surveys of predatory behavior.

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2. APPROACHES TO THE IDENTIFICATION OF PREDATION

There are two main approaches to the identification of predation. One is to use specific rules, or "bright-lines", to separate cases of predation from cases where predatory behavior is absent. The best-known of these is the Areeda-Turner rule which prevents firms from pricing below short-run marginal cost, or below its proxy, average variable costs. However, all the various "bright-lines" which have been proposed suffer from defects which limit their general applicability. The main problem with "bright-lines" is that predation could be taking place even if none of these "bright-lines" were being violated.

The alternative, rule-of-reason, approach involves taking each case on its merits. Generally it is possible to determine first whether the market under consideration is one where predation would be a feasible and rational strategy, since if it is not then it would not be sensible to investigate further. As indicated in Katsoulacos, predation is likely to be feasible and rational:

(1) where there are medium barriers to entry, i.e. where barriers are not so great that entry is extremely difficult (in which case there will be no need to predate in order to deter entry), and not so low that entry is so easy that predation will not have any effect on subsequent entry.

(2) where the market is highly concentrated, or where competition is "localized" in the sense that any entrant will compete directly with only one or a few of the existing firms. In both circumstances existing firms would be affected significantly by entry, and so would have an incentive to respond.

(3) where the incumbent firm operates in a multi-market industry (like airlines or buses), where successful predation in one market may deter entry into subsequent markets.

(4) where there is an asymmetry of bankruptcy constraints, so that the incumbent can use his "long-purse" to finance the profits he forgoes by preying.

The conventional rule-of-reason approach then considers all other relevant evidence in order to determine whether predation has occurred. This is the approach used by the UK Office of Fair Trading in their recent investigations in the bus industry. These are reviewed in Section III of this paper.

In his report on predatory pricing to the European Commission, Philips argued that predation involves the conversion of a profitable entry opportunity into an unprofitable one. Thus, proof of predation should involve a rule-of-reason approach in which evidence is provided:

to the effect that an alleged predatory price cut turned a positive entry value into a negative one for the alleged victim. It should be shown that the present value of future profits is larger than the fixed sunk entry costs of the victim under normal competition and that the price cut made this value smaller than the fixed sunk entry cost. In simple words, this amounts to showing that without the price cut, there was room in the market for an additional firm under normal competition, that is, in a noncooperative Nash equilibrium. And that, as a result of the price cutting, the price went below the noncooperative Nash equilibrium price.

If the model reveals Philips' approach requires a model which predicts the noncooperative Nash (or "normal competitive") equilibrium in the market under investigation. We have developed this approach, which we refer to as the Economic Modelling Approach (EMA), in a study of predation in the UK bus industry. Some results are discussed in Section IV of the present paper.

If the model predicts that there is no positive entry value, i.e. the equilibrium profits of the entrant $\hat{O}_e$ are negative, so that there is not room in the market for two firms, then either the entrant has entered by mistake, or alternatively the entrant is aware of the potential profitability of the market and is hoping to displace the existing incumbent. If, on the other hand, the model predicts that there is a positive entry value but the entrant actually makes losses, i.e. the actual profits of the entrant $O_e$ are negative, then predation is a possibility. However, it is necessary to be careful to distinguish predation from other possibilities that are also consistent with positive equilibrium ($\hat{O}_e > 0$) profits for the entrant. One such possibility is that the entrant chooses the wrong level of entry, in terms of prices and/or service level, by mistake. Another is that the entrant deliberately chooses a price/service level combination which is not its own best response to the incumbent's combination, in order to influence the incumbent's behavior: in the extreme, the entrant might choose a combination which denies the incumbent any profitable response.

3. UK REGULATORY AGENCIES' STUDIES OF PREDATION IN THE BUS INDUSTRY

Competition policy in the UK is the responsibility of two government agencies, the Office of Fair Trading (OFT) and the Monopolies and Mergers Commission (MMC). The OFT is concerned with the issue of whether anti-competitive practices exist. If they do, then the practices may be referred to the MMC, whose task is to discover whether they act against the public interest. This two-stages procedure naturally increases the timescale
of investigations. There are no powers to levy fines, though the government has powers to force offending parties to modify their behavior.

If the OFT believe that a complaint about predatory behavior may be justified, they institute a formal enquiry. Four such enquiries into allegations of predation in the deregulated bus industry had been completed by the end of 1991. All involved allegations that large incumbent firms had acted to force smaller or less powerful entrants out of the market.

In the West Yorkshire case a small company, Pinnacle Coaches, alleged that when it started operating a service along a part of a route operated by the incumbent, West Yorkshire Road Car Company Ltd, the latter immediately responded by cutting its fares - but only on the section of its route where it faced competition - by offering return tickets for the price of a single. In the Inverness case the entrant, Inverness Traction Ltd, started up a network of minibus services in May 1988 in the town of Inverness. Inverness was already served by Highland Scottish Omnibuses Ltd with a network of conventional bus routes. Highland Scottish was part of the nationalized Scottish Transport Group. Highland Scottish matched the entrant’s lower fares, and increased its own capacity. The entrant went into receivership in March 1989, though its operations were taken over by another firm (Alexanders). In the South Yorkshire case the incumbent, South Yorkshire Transport, reacted when a small local operator (Groves) introduced a service abandoned by SYT, by re-introducing its own buses along the route and cutting fares. In the Hull case a small operator, Good News Travels, complained of selective fare cuts and aggressive scheduling by the incumbent, Kingston upon Hull City Transport Ltd.

The OFT defined predatory behavior as involving the deliberate acceptance of losses in the short run with the aim of eliminating competition so that enhanced profits could be earned in the longer term. They recognized that such behavior could involve not only predatory price cuts, but also excessive frequency levels (“route swamping” or “overbussing”) or the unjustified matching of competitors’ timetables. Successful predators would need market power in order to finance their short-term losses and in order to be able to deter further entry once competition had ceased.

The OFT adopted a three-stage rules-of-reason approach, considering in turn:

1. The feasibility of predation. The OFT judged that the deregulated local bus market was not perfectly contestable. In addition, in all four cases the incumbent firms were dominant in their local markets and had the ability to cross-subsidize their losses.

2. The relationship between revenue and costs. The OFT took the view that prices below short-run marginal costs or below short-run average variable costs would be sufficient evidence of predation (as implied by the Areeda-Turner role), but they would not be necessary. However, in line with their view that predatory behavior involves the incumbent actually making losses (rather than simply foregoing profits), they regarded absence of losses on the incumbent’s routes as sufficient evidence to reject allegations of predation. For this reason they did not believe there had been predatory behavior in the Hull case.

3. Evidence of predatory intent. Where incumbents were making losses, but covering variable costs, additional evidence on intent would be required. Here the OFT considered the timing of competitive moves, the incumbents’ actions in markets where they did not face entry, their behavior once the entrant had left the market, their behavior in markets where they faced a powerful competitor, their explanations for the reasons for their actions, and any documentary evidence from their business plans and formal management objectives.

The OFT concluded that incumbents’ actions had restricted competition and constituted anti-competitive practices in Inverness and in South Yorkshire, but not in Hull nor in West Yorkshire, though we believe that the West Yorkshire decision partly reflects uncertainty by the Office in the face of incomplete information. In the South Yorkshire case, the Director General of Fair Trading could not refer the matter to the MMC because of the passage of time since the cessation of the anti-competitive action. However, the incumbent was warned that any similar action could be the subject of a further investigation. In the Inverness case, the OFT did refer the matter to the Monopolies and Mergers Commission.

The MMC report on Inverness was published in July 1990, sixteen months after the start of the OFT’s initial formal investigation and 22 months after Inverness Traction’s initial complaint. By the time the MMC reported the two weak initial owners of the entrant (Inverness Traction Ltd, and Alexanders) had both gone into liquidation, but the operation had passed into the hands of Magicbus (Scotland) Ltd, a subsidiary of the largest British bus operator, Stagecoach. The MMC confirmed the OFT’s belief that Highland Scottish had acted anti-competitively by considerably expanding capacity. They also believed that these predatory practices might have been expected to operate against the public interest, since the takeover of Inverness Traction by Alexanders had been unlikely and, in the absence of competition, the incumbent would probably have adopted lower service...
levels and higher fares. The subsequent takeover of Alexanders by Magicbus meant that Highland Scottish had not been able to do this.

As a consequence, the MMC did not propose any remedial or preventative measures in this particular case. Instead, the Commission believed its best short-term remedy would be "to make it clear to the bus industry that this Commission would normally expect to recommend briskly effective remedial action in any case referred to them in which they found the public interest adversely affected by an anti-competitive practice." While the MMC has no powers to impose fines, the Commission also reflected that the possibility of fines (under EC competition laws) might have "punitive and deterrent merits".

The Commission believed that the circumstances in Inverness were exceptional, in that competition continued despite the findings that the incumbent had acted anti-competitively. (However, those who believe that predatory behavior is irrational may simply conclude that the case study shows that competition was not deterred). After the long period of investigation, no direct penalties were imposed on the incumbent, though the investigations themselves imposed a cost in terms of management time and the costs of professional advice, while the incumbent's management clearly found the experience of being investigated a painful one. We think that they were also genuinely puzzled about what was expected of them when they faced a serious challenge in what was for them a major market. This challenge was actually made more serious by the fact that the entrant firm lacked management experience, and had based its entry strategy on unrealistic expectations. In particular the entrant undercut the incumbent's fares, but did not expect the incumbent to react at all. Acting "irrationally" may actually be an effective entry strategy, since the incumbent may believe that the entrant will not respond rationally to a normal competitive response.

After the publication of the MMC report on Inverness, an editorial in *Bus Business*, the influential trade publication, concluded:

...until the OFT and the MMC care to define just what they mean by "anti-competitive behavior" and "the public interest", bus companies will be left in the dark with only natural instinct to guide their behavior as attackers or defenders. And, no doubt, they will continue to fall foul of Government watchdogs for breaking rules which appear to defy logical explanation.

While this statement ignores the considerable published guidance provided by the OFT on anti-competitive behavior, it does illustrate the attitudes of many in the industry faced with the government's apparent "deregulatory schizophrenia".

4. IDENTIFYING PREDATION IN THE BUS INDUSTRY USING OF THE ECONOMIC MODELLING APPROACH

The Economic Modelling Approach described in Section II requires us to be able to identify actual profits or losses of protagonists in a predatory behavior investigation, and to identify equilibrium profits or losses. Hence we require enough data to measure the actual profits or losses of incumbents and entrants, and to calibrate a model to determine equilibria.

The models we have developed compute Nash-equilibria where two bus companies compete. Since operators compete on service quality as well as price, the models determine equilibrium fare and bus-miles, where bus-miles are a proxy for service quality in the form of frequency. The models can solve for profit maximizing combinations of these variables, but can also allow for firms having non-profit-maximizing objectives (either because the firms are genuinely not maximizing profits, or because these objectives are being used to mask predatory intent). Firms which are not profit-maximizers can be modelled as maximizing a weighted average of profits and patronage, or a weighted average of profits and consumer surplus. Bus operators' costs are modelled as linear functions of bus-miles and patronage (either passenger-journeys, or passenger-miles), plus an element of fixed costs.

We have developed two forms of the model, one with constant-elasticity demand functions and one with non-constant-elasticity demand functions. Demand for each operators' services is a function of its own fare, its rival's fare, its own bus-miles and its rival's bus miles. Ideally one would want to estimate these demand functions econometrically for the particular case being studied. So far this has not proved possible because of the need for a large enough sample of patronage and other data for each operator, and the need for sufficient variations in the fare and bus-miles variables for both firms. However, the form of the demand models used (with only one unknown parameter in each firm's demand function once the four relevant elasticities are known) enables us to calibrate demand functions from one observation of both firms' patronage, fares and bus-miles and cross-bus-miles elasticities. These elasticity estimates are derived by simulating patronage responses to fare and service changes via a generalized cost-of-travel framework within a Hotelling "spatial" model of competition on the
particular bus route being investigated. This approach to simulating elasticities, and the full equilibrium solution to the constant elasticity version of the model, are set out in full in Dodgson, Katsoulacos and Newton.\textsuperscript{20}

We have used the EMA to investigate competition both in Inverness and in another medium-sized British town, Preston. In Preston, a municipally-owned operator (Preston Borough Transport) faced entry on most of its routes from a private competitor (Zippy) operating high-frequency minibuses. Zippy matched the incumbent's fares, and Preston Borough Transport responded by increasing its own frequencies and by replacing many of its own high-capacity double-deck vehicles by minibuses. The entrant retained a slight cost advantage even when both firms were operating minibuses but was never able to achieve as high load factors as the incumbent. After a year of competition, the entrant sold out to Ribble, another bus company operating in the local market.

We used the EMA to model competition in three of the main corridors in Preston.\textsuperscript{21} In the first of these corridors, both firms initially made losses, but the model showed that there was a profitable entry opportunity. As competition proceeded, and the incumbent, Preston Borough Transport, reduced unit costs by replacing double-deck vehicles by minibuses, it was able to eliminate its losses. The necessary conditions for predation ($O_1 < 0$ and $O_2 > 0$) were still both satisfied, but we do not believe predation was the cause. In the early days of competition the entrant, Zippy, made the mistake of operating too high a level of frequency. These frequency levels were later reduced, but analysis of bus-miles reaction functions indicates that in the later days of competition the entrant could have further reduced its own bus-miles, given the fare/frequency combination offered by its rival, and eliminated its own losses. In this sense the incumbent was not denying the entrant a profitable entry opportunity, though since both firms were choosing service levels higher than in Nash equilibrium, they were both reducing the maximum profits that could be earned by their rival. In this sense the situation was akin to Stackelberg warfare, which each firm was seeking to establish market leadership but not to eliminate its rival.

In the other two corridors we modelled in Preston both firms operated minibus services. In neither market were the necessary conditions for predation satisfied. In the second corridor, the entrant earned modest profits, while the incumbent was much more profitable. The model showed that the Nash equilibrium was of this pattern: i.e. in Nash equilibrium the entrant could barely break even, and in practice had actually succeeded in doing rather better than predicted by this Nash equilibrium. In the third corridor, the Nash equilibria showed that both firms could make money in the market, and indeed in practice both did, though somewhat less than predicted by the model.

In all the runs of the model we used the models to consider the predictions about behavior that would result if either firm adopted non-profit-maximizing behavior. This was to see whether actual behavior could be explained by the adoption of different objectives to profit maximization. The incumbent's behavior could never be explained in these terms but, in the second corridor modelled, the observed outcome (of the entrant doing rather better than in Nash equilibrium) could be explained in terms of Zippy, the entrant, providing more output than if it were a profit maximizer adjusting to the price and output of its rival.

Results of our application of the EMA to Inverness are discussed in detail elsewhere.\textsuperscript{22} The constant-elasticity version of the model showed that the necessary conditions for predation ($O_1 < 0$ and $O_2 > 0$) were satisfied. Analysis of bus-miles reaction functions showed that both firms were operating higher frequency levels than in Nash equilibrium, but that each firm could have eliminated its own loss by reducing its own service level. Thus neither firm would have succeeded in eliminating the other, though the incumbent was by its actions reducing the entrant's profits and so may have deterred future entry. However the EMA also shows how the entrant was also acting aggressively. This is a factor which we think is relevant in judging the behavior of the incumbent.

5. PREDATORY BEHAVIOR IN AVIATION

We turn now to consider predatory behavior in aviation. The issue of predatory behavior has not played a major role in discussions of barriers to entry in the U.S. aviation industry. Morrison and Winston\textsuperscript{23} have shown that the industry is not perfectly contestable, but discussions of barriers to entry have concentrated on airport access, hub-and-spoke systems, frequent flyer programs, computer reservation systems (CRS) and control of feeder airlines.

Nevertheless, Alfred Kahn (the former Chairman of the Civil Aeronautics Board) has indicated that he believes predatory action to have been a significant barrier to free competition. He has described two instances\textsuperscript{24} where he believed that an incumbent had reacted to entry by undercutting the entrant's lower fares and by increasing capacity. In reviewing the unexpected consequences of U.S. deregulation, he has noted that the reconcentration of the industry in America reflects "what many of the advocates of deregulation would
characterize as a lamentable failure of the (Reagan) administration to enforce the policies of the antitrust laws - to disallow a single merger or to press for divestiture of the computerized reservation systems or attack a single case of predation". Our own investigations of competition in the US airline industry revealed a number of instances where incumbents' actions appeared to be predatory. These included instances of so-called "discipline pricing", where incumbents took predatory action against entrants in markets other than the one where new entry had occurred.

However, US airlines have been reluctant to take legal action against alleged predators. One reason is the expense of doing so, combined with the lengthy nature of the process, so that once an action is finally settled the alleged example of predation has long since passed. A second reason is the unsympathetic attitude of US courts to alleged instances of predation, in part due to the (now-discredited) arguments that predation can never be a rational strategy. Legal action is also less likely to succeed in the US because of the attitude of the Department of Justice that the yardstick for detecting predation is the Areeda-Turner rule - given the low level of short-run marginal costs of carrying passengers once capacity levels are determined, this test is unlikely to be met.

The third reason why airlines have had a reluctance to take legal action is that smaller airlines often rely on the goodwill of larger carriers for co-operation in matters such as maintenance facilities, use of reservation systems or through ticketing, and there is an unwillingness to offend them by taking action in the courts. Fourthly, many of those who may have been the victims of predation have been new airlines, whose managers have been the strongest advocates of free competition and the abolition of regulation: they are therefore reluctant to go running to government agencies for protection when they are the victims of fierce (and in our view essentially anti-competitive) actions by their competitors. Finally, action against predation would be bad for publicity, because it would appear that the complainant was asking the courts to increase air fares.

Instances of alleged predatory behavior in European aviation have not been common, and formal investigations rarer still. In part this results from the previous tight regulation of the industry. If incumbent airlines are protected by their governments against competition, then entry cannot occur, and so the issue of predation does not arise. When markets have been liberalized, some allegations of predation have emerged.

The UK Civil Aviation Authority has carried out a number of investigations which have touched on the issue of predation. They rejected a complaint from the charter carrier, Britannia, that it might be subject to unfair competition from British Airways at weekends, when BA used aircraft primarily operated for weekday domestic shuttle services. These aircraft could be operated on international flights on a marginal cost basis at weekends, but the CAA concluded that this was a legitimate use of BA's spare resources (in effect, a legitimate economy of scope). A case which involved an allegation of capacity expansion and timetable matching by BA on the London to Manchester route did not come to a full hearing, though we believe that the most likely cause of the entrant's losses in this case was an unprofitable level of entry (i.e. mistakes on the entrant's part), rather than predatory action by the incumbent. The CAA considered an application by Loganair to refuse reactivation of BA's license to operate the Glasgow to Manchester route. Loganair claimed that BA would eventually act anti-competitively if it was allowed to operate on the route. In rejecting Loganair's arguments, the CAA noted: "while the potential for anti-competitive behavior may be greatest when airlines of greatly differing sizes and strengths compete, to eliminate the risks by eliminating competition is an unattractive baby-with-bathwater type remedy".

Predatory behavior was also alleged when UK - Ireland air routes were the subject of bilateral liberalization. Liberalization in 1986 led to entry, to substantial increases in capacity and falls in real fare levels, and to a two-and-a-half-fold increase in traffic. However, the incumbent Irish carrier, Air Lingus, reacted strongly to entry by the new Irish airline Ryanair on some routes. Eventually, in September 1989, the Irish government preserved its two-airline policy by preventing head-to-head route competition by the two Irish carriers.

Elsewhere, European airlines have been protected from competition by their governments. Before it was taken over by Air France at the beginning of 1990, the main problem faced by the independent French international carrier UTA was in securing routes from the French government. When UTA was given some limited additional traffic rights in 1986, between Paris and San Francisco, Air France was also authorized to fly on this route, as well as on UTA's existing route between Papeete (Tahiti) and San Francisco. When UTA started their weekly direct service between Nantes and New York in October 1989, Air France offered passengers from Nantes a free connecting ticket to Paris if they flew to New York with Air France. Both types of response to entry may be consistent with a foregoing of short-run profits on the part of the incumbent airline.

Predatory pricing in aviation appears to be more difficult to identify than in the bus industry because of the prevalence of price discrimination. This has been growing with deregulation and liberalization, and with the development of sophisticated yield management systems linked to CRS's. The problem is to distinguish between "those deeply discounted fares, confined in principle to filling seats that would otherwise go empty, with
highly demand-elastic passengers, (which) look like the clearest examples of price discrimination that contributes unequivocally to economic efficiency,”33 from “deep, pinpointed, discriminatory price cuts by big companies aimed at driving price cutters out of the market, in order then to be able to raise prices back to their previous levels.”34 We believe that the crucial issue in identifying predation, that is in distinguishing the latter case from the former, is in discovering if incumbent firms are deliberately foregoing revenue and hence profits in pricing their capacity. However, such proof is likely to be difficult without detailed access to yield management systems and CRS’s.

We conclude on aviation that the nature of the industry is such that predation can be both a feasible and a rational strategy (see also OECD, 1988, pp. 77-78). In a deregulated or liberalized market, entry barriers are neither so low as to make entry-deterrence pointless, nor so high as to make it unnecessary. Firms operate in a number of markets (i.e. different routes), so that action in one market might deter entry elsewhere on the incumbent’s network. There will be a small number of firms competing on any single route, so that successful entry will significantly affect the entrant’s profits, and so would be worth preventing. Finally, existing (usually large) incumbents will often have a “longer purse” than potential entrants, and may, if government-owned, have a less binding bankruptcy constraint than would a private-sector competitor.

Signs that predation might be taking place include:

(i) significant fare cuts by an incumbent when entry occurs, especially if the entrant’s fares are undercut
(ii) capacity increases by the incumbent once entry has occurred or is threatened
(iii) “timetable matching” by the incumbent
(iv) operation of services by the incumbent at a loss, without proper steps being taken to eliminate such losses, when entry occurs or is threatened
(v) retaliatory action of any of the above types on other routes where the incumbent and entrant are already in competition.

The crucial issue for predation is whether, in undertaking such actions, the incumbent is foregoing some of its own profits so that a profitable entry opportunity for the entrant is converted into an unprofitable one. Proof of predation therefore requires demonstration that a profitable entry opportunity does exist on the route where predation is suspected, and that the entrant has not itself made mistakes which prevent it from exploiting this opportunity. Use of the Economic Modelling Approach to demonstrate the former is likely to prove more difficult in the airline industry than in the bus industry, because of the difficulty of modelling the range of prices offered by airlines for seats on a particular route, so a more conventional rule-of-reason approach is likely to be employed.

6. CONCLUSIONS

This paper has sought in particular to survey instances of alleged predatory behavior in the passenger transport industry, and attempts to investigate such instances. One conclusion must be that investigation is difficult, and requires detailed data on the patronage, revenue, costs and cost structures of both the incumbent and entrant firm. In addition, the investigation needs to consider the question of what alternative outcomes were possible in the market under consideration: in particular, was there a profitable entry opportunity, and did actions by the incumbent convert it into an unprofitable one for the entrant? An important issue in relation to the second of these questions is that of whether the incumbent by its actions gave up some of the profits it could have earned itself in the competitive situation. The Economic Modelling Approach can answer these questions, but the modelling and data requirements of the approach are considerable.

Investigations also need to be reasonably speedy, otherwise they will not be completed before successful predation has occurred. In addition, individual victims will have little incentive to complain if the investigations will not actually protect them (especially if they receive no compensation if predation is proven after their demise). Of course, regulatory agencies also need to be wary of unsuccessful entrants who plead predation as a source of self-inflicted woes. In contrast, those accused of predation have an incentive to affect puzzlement with the predatory behavior concept (see above, Section III). However, the concept is difficult to understand, almost counter-intuitive in a framework where governments are exhorting firms to “let the market work”, so that protestations cannot necessarily be dismissed as just a protective response.

Nevertheless, despite the great difficulties in securing an effective policy in regard to predatory behavior, we believe that the evidence in airline and bus markets does justify the careful continuation of a policy to deal with predatory actions by established firms in the industries.
NOTES AND REFERENCES

10. Philips, op.cit., 67-68. Philips describes the noncooperative Nash equilibrium as the best one can hope for in a given oligopolistic industry and the theoretical counterpart of what is called "normal" competition in policy discussions.
16. Predatory pricing is often referred to as involving an incumbent undercutting, rather than simply matching, an entrant's prices. Where a high cost incumbent faces entry by a low cost entrant, as in Inverness, the only way the high cost incumbent may be able to survive is by immediately matching the entrant's lower prices, while at the same time taking steps to reduce his cost levels to those of the entrant. Since cost levels are not likely to be reduced immediately, in the short term the incumbent may make losses, but the alternative strategies of either leaving the market or of not reacting at all may involve larger losses. We would therefore not regard fare matching in such circumstances as predatory per se.
20. Dodgson, Katsoulacos and Newton, 1992, op.cit..
21. Fuller details are set out in Dodgson, Katsoulacos and Newton, 1992, op. cit..
26. Dodgson, Katsoulacos and Pryke, op. cit..
27. For full details see CAA, Decisions on Air Transport Licensing, April 15the 1986, and CAA, Official Record Series 2, no 742, October 7th 1986.
29. See CAA, Decisions on Air Transport License Applications. Applications nos. 1A/10/16 and 1A/12/9 by Loganair Ltd and 1A/12/16 by British Airways plc heard on 27th September 1988.

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