THE NEW PRICING POLICY OF THE
BRITISH AIRPORTS AUTHORITY

By I. M. D. Little and K. M. McLeod

THE SETTING

As a nationalised industry, the British Airports Authority is required to operate in a setting substantially determined by general policies stated in the White Paper, Cmdn 3437, Nationalised Industries: A Review of Economic and Financial Objectives. The objectives are that investment decisions should be based upon discounted cash flow calculations, using a test discount factor of (currently) 10 per cent; that pricing policies should be related to long-run marginal costs (LRMC); and that each industry should seek to achieve the financial objective set for it—taking one year with another—by the responsible Minister, usually in terms of a percentage annual return on average net assets in the industry.

The relationship, and possibly conflict, between these three requirements has been questioned from time to time. The Select Committee on the Nationalised Industries (First Report, Session 1967/68), while strongly endorsing the declared investment and pricing policies, queried the role of the financial objective. In its view the correct financial results should follow naturally from the adoption of correct investment and pricing policies; if these results happened to conform to the financial objective that had been set it would (the Select Committee thought) be no more than coincidence.

This question has never been satisfactorily answered. For the British Airports Authority the financial objective has been set at a 14 per cent return on average net assets; its new investments are required to show a DCF rate of return of 10 per cent; but the pricing principles it should adopt while meeting these requirements have not been enunciated. The financial objective might, or might not, be consistent with the LRMC principle endorsed in Cmdn 3437, but there is no doubt that LRMC arguments did not in practice enter into its determination. In Cmdn 4027, paras. 21 and 22, it was stated that "the Government intend to elaborate these principles and qualifications (those of Cmdn 3437) as necessary in working out, with the industries, individual pricing policies for each industry... These discussions will in many cases be linked to the renegotiation of financial objectives as these fall due for renewal". So far as we are aware there have been no such discussions or linkages.

The Authority's pricing policy has also to be considered in its international setting. Existing pricing systems at international airports have evolved over the years in rather a hodge-podge way. Charges range widely in structure and levels, but most systems have one feature in common: the main aircraft charge is normally based on the maximum permitted all-up-weight of the aircraft, often with break-points in the scale. This is in many cases supplemented by a passenger charge which, until fairly
recently, was normally paid direct to the airport by the passenger and could vary between one type of passenger and another. This kind of system has been endorsed and recommended to member nations by the International Civil Aviation Organisation (ICAO), and also has the support of the airline organisation – the International Air Transport Association (IATA). The basic principle recommended by ICAO was that airport charging systems should be such that each type of traffic should bear its fair share of airport costs – but ICAO did not specify how “airport costs” were defined or measured in this context, or how a “fair share” should be assessed. It is not, perhaps, surprising in these circumstances that, in the absence of any clear and defensible charging philosophy, consultation between an airport and its airline customers about the structure and levels of its charges often comes to resemble a form of guerilla warfare.

The Authority’s pricing policy hitherto has conformed broadly to the kind of system recommended by IGAO. As a result Heathrow’s capacity during peak summer traffic periods has for several years been to some degree inadequate to handle all the potential demand. This has hitherto been dealt with, reasonably successfully, by administrative arrangements rather than by pricing methods.

Under these arrangements it has been the practice at Heathrow for the airport management to declare each September, after consultation with the airlines, the capacity limitations the airlines should observe for the following summer season. A similar declaration is made each April of the limitations applying during the following winter. The declared limitations are in terms of hourly runway capacity (which is the most critical), hourly passenger flow capacities of the terminal buildings, and availability of aircraft stands.

The airlines then make “bids” against these declared capacities, in the form of proposed summer or winter schedules through Heathrow, and an airline committee adjusts these proposed schedules to bring them within the declared capacities. These adjustments also seek to smooth out any short transitory peaks that might cause congestion, even though the total demand for the hour as a whole is within the declared capacity. Arrangements on similar lines were started at Gatwick last year.

There is no doubt that these arrangements have worked successfully, within their limits, in controlling congestion and delays. But their limitations are becoming increasingly important. For example, some airlines, though operations at peak times are important to them, are not able to compete effectively for available capacity; and other airlines have no incentive to transfer operations out of the peak times. With demand bearing increasingly hard upon capacity limitations, these established administrative arrangements were being called increasingly in question.

LONG-RUN MARGINAL COST

The general instruction to relate charges to long-run marginal cost is very hard to interpret in the case of airports, and it leaves most of the apparently important problems unilluminated. To start with, it is very hard to make an estimate of the level of long-run marginal cost, and this certainly could not be done before the choice of a site for the Third London Airport. In any case, it is highly questionable whether LRMC is a relevant concept in cases of extremely lumpy investments.
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Airports are quite unlike electricity, for example, where each new generating station is marginal to the system.

We take it that the instruction means that one should select a set of prices which would result in a zero present value, at a 10 per cent discount rate, for the next major investment, i.e., Maplin.1 This leaves plenty of room for manoeuvre, for if there is any such set of prices there is probably an infinite number of such sets.

But why should the set of prices thus be constrained? So far as the allocation of resources is concerned, there are two possibly conflicting aims of a pricing policy:

(a) to lead to an optimum use of existing capacity;
(b) to help produce the best possible investment decisions.

It is well known that LRMC pricing may be inconsistent with the first aim; but one must not underestimate the importance of the second. In some industries a simple instruction to charge LRMC may be helpful for investment decisions. But, as we shall see, merely covering LRMC somehow, by any old pricing policy, is no guide to investment decisions for airports. The point is that it can be covered in a multiplicity of ways - some helpful, others not. The need for new capacity is determined only by peak demands - a pricing policy which does not reflect this cannot be helpful for investment decisions. In fact, the decision on the Third London Airport, and in particular on "the timing of the need" for it, was made without benefit from the pricing policy of the British Airports Authority. It was made by estimating the cost of delays, which, as we shall argue, should not occur with a proper pricing policy.2 The Roskill Commission took the Authority's pricing policy as given; this was understandable, since the Authority gave no indication which might have made it think otherwise.

To sum up:

1. The financial target may preclude LRMC pricing – and it is this target which determines the general level of charges (given costs).
2. To price according to LRMC is no guarantee that the pricing system will tend to lead to new investment of the right kind at the right time. In certain industries it may – but not for airports, which are characterised by extreme lumpiness of investment and by peaking problems.
3. LRMC may be inconsistent with optimum short-run usage.

AIMS OF THE NEW POLICY

The aims of the new policy were to reconcile the objectives of optimum use of existing capacity and of a pricing policy which will in future help to guide investment decisions, so far as this is possible within the constraint of a financial target.

It may be suggested that part of this policy is shutting the door after the horse has bolted, as far as Maplin is concerned. To that we can reply that Maplin is like Rome

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1 The site, previously known as Foulness, chosen by the Government for the Third London Airport.
2 The cost of delay method employed by the research team indicated 1981. The Commission brought the date forward to 1980, saying "we think it wrong to choose a date which risks a substantial overload at Heathrow, thus further exacerbating the noise problem for London and involving costly delays to air traffic". Report para. 5.54.
in that it will not be built in a day – although it is unlike Rome in that no roads lead there.

There are many features of the BAA’s pricing policy and revenue which we shall not discuss – shops, aircraft and car parking charges, rents, etc. This does not imply that these are of no importance, but merely that we want to concentrate on charging for aircraft movements and air passengers.

A MODEL TO ILLUSTRATE BASIC PRINCIPLES

Consider a facility, say a runway, which when built would have excess capacity at all hours of the day for many years, even if no charge for its use were made. Suppose also that use of the runway causes no real cost to be incurred – i.e., there is zero short-run marginal cost. If the demand has greater than zero elasticity, optimum usage requires that no charge be made. We shall also assume, for simplicity, zero depreciation – i.e., that runways last for ever.

Suppose initially that no charge is made. Demand builds up until, at certain times, there is excess demand. Then optimum use requires a charge at those times which just stops congestion – call it a peak charge. As the years roll on, and demand rises, more and more minutes in the year require a peak charge, and the peak charge becomes higher and higher for the most popular hours. But many free hours might remain.

How does one decide whether and when to build a second runway? Assuming its cost to be known, what has to be estimated is the value of the demand which is suppressed by the peak charges, and would not have to be suppressed if there were more capacity. For it is this value which represents the benefit to be gained by extending the capacity.

A simple diagram illustrates the point.

\[ DD_1 \] is a demand curve for use of a particular time interval. \[ OC_1 \] is existing capacity, and \[ OC_2 \] is doubled capacity. If a zero price is charged, there is excess demand of \[ C_1D_1 \], resulting in rationing or delays, or both.

If the equilibrium price \[ OP_e \] is charged, there need be no delay or rationing. The triangle \[ EC_1D_1 \] then represents the value of the suppressed demand. In considering
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whether to build another runway, one must in principle estimate the area $EC_1D_1$ for each time interval.\(^3\)

As soon as the extra discounted cost of building the runway earlier rather than later (say, by a year) is exceeded by the total area of the triangles $EC_1D_1$ for that year, one builds the runway (of course it is necessary to anticipate this in advance, since construction takes time).\(^4\) No one would want to claim that such a procedure is easy. But at least it is a help in the guessing game to have a number of points or beacons, such as $E$, over a period of years.

The same diagram can be used to explain the Roskill method of assessing the "timing of the need". Roskill assumed that the BAA would not use peak pricing, and that there would consequently be a price such as $OP_a$, the same for all intervals and roughly equal to prices then in force, at which there would be excess demand at peak hours, equal in the diagram to $FG$. Of course actual movements would be somehow restricted to $OC_1$. This would come about as a result of the real cost, in terms of time lost and extra fuel, etc., of delays. This real cost would have to be equal to $EF$ (the difference between the equilibrium and the actual price). Roskill also added in an estimate of the value to the airlines of the suppressed demand – the triangle $EFG$. The upshot is that Roskill was estimating the area $P_EG_P_a$.\(^5\) Given equilibrium pricing, the triangle $ECD_1$ is the correct area to estimate. If demand was very inelastic, the Roskill estimate would greatly overstate the benefits.\(^6\)

This does not imply that the target date of 1980, set for Maplin, is necessarily too soon. Demand estimates are very uncertain. Furthermore, Ministers have, since Roskill, made a number of announcements on environmental grounds about the future development and use of airports around London which could further limit the capacity of the existing system. On the other hand, the air transport industry has tended to con itself and others into believing that something like disaster or chaos would occur if there were not "enough" capacity. All that need happen is that the price will rise, and some people will thereby be dissuaded from air travel, or will travel through other airports. Also, the rise in price will be moderated by airlines using larger aircraft, so spreading the peak charges over more people.

After this digression into reality, let us return to the model and consider it further. So far we have assumed a pricing policy which both ensures optimum usage of existing capacity and gives maximum guidance for making proper investment decisions. But it certainly does not ensure that travellers pay the total cost incurred. Whether this is a desideratum is a debatable matter, to which we return later.

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3It is possible that, for some intervals, $D_1$ will be to the right of $C_2$. Some demand would continue to be suppressed. A (lower) peak charge would remain, and the relevant area to be estimated would be a truncated triangle.

4This statement requires some qualifications. For instance, the test is valid only if those who move from off-peak times when capacity is expanded enjoyed no consumers' surplus before. Thus the sum of the triangles as described oversates the benefit to some extent.

5Roskill also made an estimate assuming some management of the peak. Such rationing reduces the cost of delays to less than $EF$, but adds other costs (the actual administrative cost of the rationing plus the losses occasioned by the fact that some who are excluded would have been willing to pay more than some of those included).

6That it was a serious overestimation has been suggested by P. Forsyth: "The Timing of Investments in Airport Capacity", *Journal of Transport Economics and Policy*, January 1972, using broadly the same approach as that described here.
Whether or not, under such a system, air travellers would in fact (ultimately) pay for the airport depends, apart from its cost, very much on the growth and elasticity of the demand. At one extreme, demand might grow very rapidly after the runway came into use, so that peak charges would soon be required. If then the peak demand ceased to grow, and were inelastic, a new runway might never be justified; and the old runway might ultimately achieve a positive value, discounted back to the date of initial expenditure. At the other extreme, the first runway might never need peak charges and yet have been justifiable in terms of what people would have been willing to pay. It would make little difference if, after a long period of slow growth, demand suddenly accelerated; for then a second runway might well be justifiable long before the first had earned its ten per cent yield. In reality, the latter has been the case for airports. Under the pricing principles outlined they would never have paid for themselves.

The principles of pricing discussed above are precisely those of marginal cost pricing, in conditions of lumpy investment where long periods of less than full capacity operation are inevitable. To this extent the analysis is very much in the spirit of Cmnd 3437, although the letter is not applicable. But, of course, such principles cannot be applied without modification in the face of the requirement to meet a financial target.7

This brings one back to the question whether the users of a service should be expected to pay its total cost. It seems to us that one cannot generalise so simply. Some services and commodities are deliberately taxed and others subsidised. Also, some commodities and services earn monopoly profits for their entrepreneurs (and their workers), and this is not unlike private “taxation”. It is useful to think of taxation (or “taxation”) and subsidisation as the amount charged for a service above or below that price which is the most efficient price from the point of view of the use of resources.

We have defined efficiency prices in the model used above. Any higher charges can be regarded as analogous to taxation. Now if something is consumed by the relatively rich, and is in inelastic demand, it is a good candidate for taxation, perhaps heavy taxation. There is thus no particular reason why an airport should exactly cover its total costs. Perhaps it should do much more, perhaps much less – depending on the level of demand, and on how good a candidate for such taxation the authorities consider it to be.

If the airport authority (in our model) is required to make a certain amount of money greater than would accrue with efficiency prices, then it can see itself as a kind of tax-farmer required to raise the money according to the best principles of taxation. It is unlikely to be able to discriminate between the degrees of wealth of those using its services. It must therefore put the taxes where the demand is least elastic. This causes the minimum interference with usage.

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7The fact that, under such a regime, full costs may not be covered has nothing to do with economies of scale. Whether or not the London airport system has (apart from transport to and from airports) economies of scale, or the reverse, is very difficult to say. One certainly could not attempt to answer the question until it was known where the TLA would be! It is in any case, in our opinion and according to our analysis, largely irrelevant.
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Our model airport management thus uses three principles:
1. Always charge enough to avoid excess demand.
2. Never charge less than (short-run) marginal cost ( = zero in the model).
3. Thereafter charge “what the market will bear” until the financial target is achieved.

These indeed are the principles which have led the Authority towards its new pricing policy. Let us now return to the problems posed by the various Governmental guidelines on pricing and investment in nationalised industries.

We have seen that the Select Committee rightly pointed out a possible contradiction between financial objectives on the one hand, and long-run marginal cost pricing with a DCF rate of return criterion for new investment on the other hand. We believe we have given good reasons for subordinating long-run marginal cost to the financial objective, in the case of airports at least – and we must emphasise that we have no wish or competence to generalise more widely. However, this subordination does not remove all possible contradiction, for the financial objective can be in conflict with the rate of return on new investments.

If the Treasury imposes a high financial objective on a public near-monopoly – at present 14 per cent in the case of the BAA – it also imposes a high level of charges, which must make more investment pass the test discount rate criterion than would otherwise do so. Of course, capacity-creating investment will in turn be limited by the (slightly) reduced demand resulting from high charges. But there is also quality and standard of service to be considered – always a very difficult matter for the Authority to decide. For instance, if charges are high a new terminal can be more luxurious and still pass the DCF test. If investment, including investment in quality, were pushed to a limit set only by the test discount rate, then the financial objective could not be met in the long run. The aims of the Treasury in creating a high financial objective would not have been met. There are many possible ways of eliminating this dilemma. We shall mention only one – that the BAA be fully aware of it.

It should be noticed that in practice the links between the financial objective and rates of return on investment are tenuous. First, the financial objective is set on assets valued at historical, not replacement, cost. Secondly, it would be absurd to expect a constant financial objective to be achieved in the case of airports, which should, if properly managed, go through alternating periods of low and high capacity use.

SOME COMPLICATIONS

The model discussion in the previous section effectively assumed (by ignoring it) that passenger handling demand was directly related to, and determined by, runway demand. It also assumed that all aircraft movements were alike in the demands they made on runway capacity. These assumptions cannot be passed over unexamined – and, if necessary, complications must be introduced into the model. The model also assumed no depreciation – but we propose to let this bit of unreality stand. A discussion of depreciation policy would raise many problems which cannot readily be considered within the scope of this article.

The assumption that demands on runway and passenger handling capacities are
directly linked, and that peak demand on one coincides with peak demand on the other, can readily be tested. In each of the main categories of traffic (domestic arrival movements, domestic departure movements, European arrivals, etc.) the correlation at Heathrow is close; but, in the aggregate, significant differences appear, owing partly to differences in the composition of traffic at various times of the day – the proportion of large aircraft being much higher at some periods than at others – and partly to variations in passenger loads.

Thus the peak period for aggregate runway demand at Heathrow, taking arrival and departure movements together, runs from 0900 to 1300 BST. For aggregate passenger movements the peak demand runs from about 1000 to 1500 BST – although the beginning and end of the passenger movement peaks tend to be less marked than those of the runway peaks.

There is, however, a special problem at Heathrow arising from the segregation of different types of traffic into different terminals, so that passenger handling capacity, unlike runway capacity, is split into units each with its own capacity limitations. It is in terms of these units, therefore, that the correlation of runway and passenger handling demand must be examined.

It is found that, for these units, the correlation is far less close. In particular, some of the main peaks of arriving passengers in the individual terminals fall right outside the runway peak hours – and usually do not coincide with the peaks of passenger arrivals at other terminals. The clearest example is the arrival peak of passengers passing through the intercontinental terminal, Terminal 3. The peak hours here are 0700–0800 BST – which is right outside the runway peak period.

It is evident from this that if it were possible at different times of the day to switch, say, arriving passengers between terminals and thus exploit the total available passenger handling capacity more fully, there would be a great gain. But such flexibility is difficult to attain in practice. Airlines have their established arrangements for dealing with passengers in one terminal, and their ticketing procedures and instructions to passengers on tickets or through agents are geared to operations through that particular terminal; so are their aircraft-handling procedures. There are thus real difficulties in the way of greater flexibility of terminal use; but it is an aspect on which further study seems necessary.

The second assumption in the model that needs some examination is that aircraft movements are all alike in the demands they place upon runway capacity.

In the length and strength (and hence construction cost) of the runway required by particular types of movement there is, of course, a wide variation. The ordinary short-haul air transport movements at Heathrow, for example, comprising more than 70 per cent of the traffic, could all operate satisfactorily on runways that are only 70 per cent of the length of the main runways provided, and of significantly lower strength. A small general aviation aircraft requires even less.

In the time demand on runway capacity there are also variations, though these are less clear cut and to some extent conflicting. There is little real difference between the time demand of one type of air transport movement and another. Their operating speeds close to the airport, at take-off or landing, do not vary sufficiently to make any significant difference to the time taken for runway clearance. There is, however, the extreme case of small general aviation aircraft, operating at relatively low speeds and requiring little runway distance for landing and take-off. Their actual times of
runway occupation and clearance are likely to be very much shorter than for a large transport plane. To this extent their demand on runway capacity at the peak could be less. Their inclusion in the traffic flow, however, especially on landing, has the reverse effect. Because their approach speeds are lower than those of other aircraft that are being fed into the approach pattern at peak runway periods, they have the effect of introducing a delay factor and some "friction" in the approach sequence, with consequent reduction in the effective runway capacity.  

These aspects will be considered further in discussion of the pricing system actually adopted.

APPROACH TO THE ACTUAL SOLUTION

It was plain that ample capacity existed at the Scottish airports and Stansted. Peak congestion was actual or incipient only at Heathrow and Gatwick. At Gatwick it was felt that a raised minimum landing fee would be sufficient to deal with the incipient peaks for a while. The same method was applied to Heathrow in the afternoons. So what follows can be read as applying only to the morning peak at Heathrow.

Apart from the constraint of costs and the financial target, and the requirements of efficiency in the use of resources, some attention had to be paid to simplicity. At airports it would not be difficult or expensive to compute or collect charges based on a large number of variables. The chief reasons for a relatively simple initial structure are (1) that the airlines might find it difficult to react rationally to a complicated structure, and (2) that further complications might be better introduced gradually, if the need for them is clearly seen.

The Peak Charge

We have seen that economic logic suggests that there should be both a peak charge for the use of runways and other aircraft-related services, and a separate peak charge for passenger facilities, if passenger handling capacity is not strictly determined by runway capacity. We have seen that it is not so determined, because the mix of different-sized aircraft varies at different times, and because of some inflexibility in the use of the three terminals at Heathrow. Nevertheless, it was decided not to introduce a peak passenger charge, anyway at first. The reasons that influenced this decision were that by far the biggest new investment expenditure will be at Maplin, and that the reason for it is lack of runway capacity, rather than of passenger handling capacity.

Furthermore, in the meantime, more efficient use of existing terminals at Heathrow may be attainable without undue disturbance to passengers. Terminals are more flexible than runways: it is uncomfortable for people to bump into each other, but

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8See J. V. Vance: "Movement Time as a Cost in Airport Operations", Journal of Transport Economics and Policy, January 1969. This article suggests that when general aviation is a small fraction of the total peak flow, as is the case at Heathrow, the runway time demand of a general aviation movement is very close to that of an air transport movement.
not disastrous as in the case of aircraft. The desire for simplicity was another consideration. Nevertheless, further experience and reflection could change the balance of the argument.

Differential charges based on the landing or take-off performance of aircraft were also ruled out. There are two questions here: (a) the air space and runway time required, and (b) the length and strength of the runways. On the first, given the likely normal aircraft mix of the peak traffic flow, it was not felt that different aircraft consistently made sufficiently different system time demands for discrimination to be worthwhile (an exception might have been the Jumbo, whose turbulent wake requires an extra long lag between its take-off and the next).

Charging according to the length and strength of runways is a more complicated question. There is no economic point in charging less for aircraft needing only short or weak runways, if one is not going to build such runways. In short, segregation is necessary to justify this discrimination. It is therefore only necessary to let it be understood that if STOL runways actually get planned STOL aircraft will be charged less. Equally, there is no point in charging more for aircraft needing long runways unless this is a factor which will be taken into account in the design of future aircraft. If there were a gleam in aircraft planners' eyes for three-mile runways, then we should think again. The Boeing Company cunningly caused airports throughout the world to shoulder the cost of providing longer runways for 707s. It did the same with the Jumbo, which required new passenger-handling facilities. Twice is, perhaps, enough. It is, however, clear that one airport authority would have little influence. If aircraft companies and designers are to take account of the total systems costs resulting from the introduction of new aircraft, the airports of the world must unite to design pricing systems which will have this result (and much the same applies to noise).

Having ruled out these reasons for introducing different peak charges for different aircraft, we were left with a flat charge (of £20) for each arrival and departure. The only exception is for helicopters, which do not enter the flow of runway-using aircraft, and so make no capacity demands.

In addition to being invariant between aircraft, the peak charge is invariant between different sub-intervals of the time periods designated as peaks. Ideally, this cannot be right, since some of these sub-intervals are likely to be much more "peaky" than others. But the following reasons weighed against any attempt at fine-tuning, at least on the first attempt: (a) that the initial peak charge was probably rather low, (b) that quite a large part of the variation from hour to hour, or minute to minute, is due to random causes, and (c) that the influence of the new charge itself was extremely hard to predict.

Traffic figures for a number of years (broken down in the case of 1970 to five-minute intervals) were examined as a basis for judging when peak periods should begin and end. Consideration was given to introducing "shoulder" charges at the beginning and end of peak periods, in case the new charge caused artificial peaks to

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9Ideally, every interval should bear either no peak charge or one high enough to make excess demand at all potential peak intervals equally unlikely (the desirable likelihood of excess demand being set at a fairly low figure); each such peak charge can in principle only be determined simultaneously with the rest.
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develop just outside the peak periods. Another alternative examined was that of staggering the peak time for departures and take-offs by a short interval. But, given our lack of knowledge of the effects of the new charge, it was finally decided to opt for the simplest thing, and wait and see what happened.

The height of the peak charge was chosen in ignorance, since there was no experience to go on, and because it was difficult to interpret the effects of the policy of "managing" the peak. The knowledge that such management could and would be maintained until more knowledge of the elasticity of demand was built up permitted the British Airports Authority to choose initially a rather lower peak charge than it otherwise might have done. Even so, it is believed that the charge will be sufficient to cause some shifting, especially in domestic traffic, where £20 is clearly a significant fraction of revenue earned, and in general aviation. It is very possible that experience, and the growth of traffic, will show that a much higher peak charge will be desirable later. In this connection it must be emphasised that peak charges permit reductions for non-peak traffic below what that traffic would otherwise have been charged (since total revenue is determined by the financial target and by costs).

The Standard Charge

The charging system in force at the Authority's London airports before 1 April 1972 was based wholly on the maximum permitted all-up-weight of the aircraft, the "standard fee" for the aircraft being assessed at between 25p and 45p per 1000 lbs. all-up-weight, depending on aircraft weight. This standard fee constituted the charge to be applied to normal domestic passenger flights, but short-haul flights of up to 115 miles stage length qualified for rebates of between 50 per cent and 80 per cent. International passenger flights were subject to a surcharge of 10 per cent in the case of European services and 80 per cent in the case of intercontinental flights. All cargo aircraft were charged the same fees as passenger aircraft (including the appropriate flight surcharge), but with an overall rebate of 20 per cent to reflect the fact that these aircraft made no use of airport passenger facilities.

These fees covered a landing, six hours' free parking, the use of the passenger or cargo facilities on arrival and departure, and the subsequent take-off.

The logic of this system is not particularly easy to discern. All-up-weight could be regarded as a measure of the long-run costs incurred by airports. But these depend mainly on the number of passengers, the length and strength of runway required, and above all on when the aircraft wants to move. Although the two former are correlated with all-up-weight, the correlation is not very high. Alternatively, and more plausibly, it can be regarded as a measure of ability to pay. Ability to pay depends on the proportion airport charges bear to the net operating revenue from the flight. Again this is correlated with all-up-weight; but not very closely, because net revenue depends also on the number of passengers and the length of the flight. In

10The existence, and continuation for some time at least, of the management system certainly makes it easier for the BAA to feel its way into a satisfactory peak pricing system, without risking delays on the one hand or overstepping the mark on the other hand. Continuing agreement on schedules may be desirable indefinitely to prevent too many attempted departures "on the hour".

11The progressiveness of the charge on all-up-weight was intended to give a better reflection of ability to pay than a proportional charge would have done.
short, while all-up-weight can to some extent be claimed to measure either costs or ability to pay, it does neither job well.

The intercontinental surcharge was, it was claimed, introduced to make the big jets pay for the runway extensions they had caused—but ability to pay was also mentioned. The former sounds rather like a rationalisation after the event. In truth, it was probably put on more because of ability to pay. Ability to pay is also the best defence for lower domestic charges (and for short-haul rebates), although it is also true that domestic flights require rather less service.

The new standard charge is more frankly based on ability to pay. Now that the capacity costs caused by movements are to be linked to peak charges, ability to pay (or, as the economist would say, inelasticity of demand) becomes, as we have seen, clearly the proper criterion (subject only to short-run marginal costs being covered). The general problem is then to find the best proxy which an airport authority can use for inelasticity of demand.

The profitability of a flight would be the best measure, but an airport authority cannot know this. The total revenue from the flight is probably the next best measure, and one could suggest that a rational basis for airport charges would be the value of the tickets sold for that flight (or for the last stage of a “stopping” flight). But, although that is easily ascertainable, the authority would be at the mercy of the airlines, and in any case where a ticket covered many flight stages apportionment would have to be made on a mileage basis. One then comes to a landing charge determined as some function of the number of passengers and the distance travelled on the last stage.

In arriving at the actual compromise solution the following considerations were also borne in mind:

1. Any move to a pure passenger/mileage based charge would have greatly disturbed the relative existing charges paid by different airlines, and also by charter flights as compared with scheduled traffic. There is a lot to be said in favour of steering one’s customers fairly gently.

2. The existing distinctions and definitions of domestic, European, and intercontinental flights are well understood, and are a crude measure of ability to pay. The argument for gradualism was again influential, and therefore consideration of more sophisticated formulae was deferred.

The compromise solution implies that about 32 per cent of the standard charge will now be passenger-related, the all-up-weight formula still applying to the remainder; and the domestic, European, and intercontinental distinction is retained.\(^{12}\)

Two further points concerning the passenger-related element are worth noting:

(a) Since the standard charge applies at peak periods, as well as off-peak, it goes some way towards seeing that large aircraft contribute to the passenger-handling capacity costs they cause.

(b) It is expected that the number of passengers will grow a little faster than all-up-weight. To the extent that this makes the Authority’s revenue more buoyant, it will mean fewer adjustments of charges, which is all to the good.

Finally, it may be noted that the new standard charge has not been applied to

\(^{12}\)The actual formula is given in page 113.
NEW PRICING POLICY OF THE BAA

I. M. D. Little and K. M. McLeod

Prestwick or Edinburgh. In this connection it should be noted that the elasticities of demand for particular kinds of traffic may differ between different airports and different airport systems. There is thus no fundamental reason why the same formula should be applied. New charges for the BAA's Scottish airports remain under consideration.

Minimum Charges

Almost all costs at an airport are related to peak demand. Therefore short-run marginal cost, though not zero as in the model described above, is very low relative to the actual charges for most classes of traffic — with the exception of very light aircraft, which in some cases were paying less even than the cost of collecting the fee. As a result, minimum charges have been revised. Also as already noted, a peak minimum landing charge of £5 was introduced at Gatwick, and at Heathrow on some afternoons, to discourage light aircraft from using the runway when its air-transport use was heavy.

NEW AND OLD SYSTEMS

In summary, therefore, the new pricing system for the Authority's London airports is as follows:

1. Standard fees are levied for air transport movements at all three airports at all times of the day or year at the following rates:

<table>
<thead>
<tr>
<th></th>
<th>Per tonne all-up-weight</th>
<th>Per passenger arriving at</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First 45 tonnes</td>
<td>Excess over 45 tonnes</td>
</tr>
<tr>
<td>Domestic flights</td>
<td>30p</td>
<td>35p</td>
</tr>
<tr>
<td>European flights</td>
<td>55p</td>
<td>65p</td>
</tr>
<tr>
<td>Intercontinental flights</td>
<td>110p</td>
<td>130p</td>
</tr>
</tbody>
</table>

2. At Heathrow, between the hours of 09.00 and 12.59 BST on 150 designated summer days, a peak surcharge of £20 will be levied on every runway movement, whether landing or take-off.

3. At Heathrow, between the hours of 13.00 and 17.59 BST on the same 150 designated summer days, there will be a minimum landing fee of £5.

4. At Gatwick, between the hours of 09.00 and 18.59 BST on 15 designated week-ends (Saturday and Sunday), there will be a minimum landing fee of £5.

5. Apart from the £5 minimum specified in 3 and 4 above, there will be a standard minimum fee of £2 at all three airports.

The principal effects of the new standard charges (excluding for the present the peak surcharge at Heathrow) will be:

(a) Scheduled domestic passenger services, carrying the same passenger loads as were carried in 1970, will on average pay 29 per cent less than in that year.

(b) Scheduled European passenger services will on average pay 17 per cent more — bringing the charges for these services more into line with those charged at other major European airports.

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Scheduled intercontinental passenger services will on average pay the same as in 1970 for the same load factors – the present charges for these services being already higher than the comparable fees at most other international airports.

Charter services – owing to their very high passenger load factors – will on average pay 25 per cent more than in 1970, but still substantially less on a per capita basis than the average scheduled flight of the same stage length.

All cargo operations will on average pay 13 per cent less.

Passenger aircraft with higher-than-average loads will pay more than the figures in (a) to (d) above indicate; those with lower-than-average loads will pay less.

In addition, the peak surcharge at Heathrow is expected to yield some £650,000 in 1972, which – together with the results of the increases and reductions outlined above for various services – should result in an overall increase in landing fee income at the London airports in 1972/73 of about £1.5 million, or 7 to 8 per cent. This is the level of increase in income that was judged necessary to produce in 1972/73 the 14 per cent return on the Authority's average net assets required by the financial objective.

The effect of the new charges on the small aircraft in the general aviation group seems likely (from representations that have been made) to be striking. In 1970, 25 per cent of all aircraft movements at Gatwick were general aviation, and two-fifths of these were free landings, either under arrangements of many years' standing for clearance of customs, or by the possessors of Royal Aero Club landing cards. Many of these landings occurred at the busy summer weekends. The introduction of the minimum charges, and particularly the higher summer weekend minimum, could see substantial reductions in the less essential movements and transfers out of the summer weekends – with a consequent release of capacity for the rapidly growing number of air transport movements.

The effect at Heathrow is not expected to be so striking, as the number of general aviation movements is much less than at Gatwick. But general aviation is likely to be the first to respond to the £20 peak surcharge, and thus reduce in some degree the demand at peak times.

LONG-TERM CONSIDERATIONS

This new charging policy, based though it is in detail on the circumstances of the London airports, appears to be of wider general application. The opportunity to present it for discussion could perhaps arise at an ICAO Conference which is being held in Montreal in 1973 to discuss airport charges generally. This is a follow-up to a similar conference held in 1967, which produced the recommendations about airport pricing that are referred to and commented upon in the first section of this paper. It is to be hoped that the Conference will be willing to look again at some of the old practices and policies recommended by ICAO, and to consider a different approach.

It is in any event desirable that the objects of the policy should be properly under-
stood in the airport world. An airport is just one of a series of operating links to other
airports, and its capacity problems – and the means whereby it tackles them –
cannot be considered in isolation. The action taken at a major international airport
such as Heathrow is likely, in time, to have repercussions throughout the route
networks passing through the airport, and possibly some effects on the incidence of
peak demand at other major airports. Equally, the introduction of peak pricing at
any major airport with extensive services to and from Heathrow could in its turn
have an effect on demand and operations at the London end. International consulta-
tion between airport organisations, as well as with the airlines, seems clearly
desirable.

The pricing system now being introduced at Heathrow has deliberately been
kept simple. It will obviously be reviewed in the light of experience, and other
variants may in time be introduced. One that has already been considered, although
rejected for the present, may usefully be mentioned here. This is the factor of aircraft
noise.

The recent imposition of limitations on the use of existing airports and on their
potential development, which have the effect of reducing their overall capacity to
meet demand, is largely attributable to the burden of aircraft noise – and in par-
ticular to the use of certain very noisy types of aircraft. These are mainly the B707,
VC10 and DC8. The introduction of a surcharge on the fees paid by such aircraft
ought in theory to discourage their use and promote their replacement by quieter
types, to the benefit of communities around the airports, and might also lead to a
reduction in current limitations on airport use and on potential development.
Meanwhile the product of the noise surcharge could, it might be argued, be used to
ameliorate the conditions for those particularly affected by the noise.

This proposal appears *prima facie* very attractive. There are a number of practical
difficulties about implementing it, but ways round these could probably be found.
The real problem, however, does not lie there. It lies in the near certainty that the
introduction of such a surcharge at just one or two airports in an airline network
would have no significant effect on aircraft design or procurement – or on operating
programmes, unless the surcharges were extreme. Thus minimal benefit would
accrue. It is also unlikely that the product of the surcharges would in practice find
its way to the victims of the noise as compensation, though this does not in itself
seem important. They can more readily be assisted by appropriate noise insulation
grants, determined by the Department of Trade and Industry and paid by the airport
authority, and unrelated to any specific noise surcharges.

In the longer term, as and when significantly quieter aircraft types become
available and existing types can be quietened by retrofitting them with quieter
engines, the chances of securing an effective response to the introduction of a noise
surcharge should greatly increase. Even then, however, the influence of a surcharge
at one or two airports alone would be small, and it would be necessary to secure
co-ordinated action by international airport groups to achieve results.

*British Airports Authority*