

# The future development of air traffic in the UK

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## Abstract

There is not a convincing case for investing in any of the new runways or airports proposed by the Department for Transport (2002). If air transport covered all its social costs by paying the same fuel taxes as other transport, air fares would increase and hence air traffic would decrease. The case for taxing air transport is so powerful that current international negotiations should lead to new charges on aviation. Extensions of runway capacity, while traffic decreases, would lead to losses on investment. Private investors should not rely on a future government to cover such losses when present government policy excludes public funding of new airport capacity.

## Keywords

Airports, aviation, economics, finance, fuel price, investment, public policy, travel

## Introduction

This paper responds to the Government's appeal for comments on proposals to increase the number of runways and airports in the UK, as described in *The Future Development of Air Transport in the United Kingdom* issued by the Department for Transport in July 2002. These proposals are based on air traffic forecasts made by the Department in its *Air Traffic Forecasts for the United Kingdom 2000* issued in May 2000. Special reference is made here to the proposed developments in South-east England, though most of the discussion relates to the whole country.

Air transport in the UK is a major leisure industry. In 1998 some 76% of air traffic was for leisure purposes with the remaining 24% for business. Nowadays, UK holiday makers like to go abroad for their vacations, whereas their parents and grandparents used UK seaside resorts. Again, current football fans follow their teams in away matches around Europe (and beyond) whereas their forefathers did not. In 1998 air transport generated some 180,000 jobs. This is a gross figure; there is no estimate of the number of jobs destroyed in UK seaside resorts so we cannot estimate the net number of jobs created by the aviation leisure business. Perhaps the present economic problems of UK seaside resorts are part of the price to be paid for economic progress. This view is likely to be rejected by the MPs and other representatives of these towns, on

the grounds that competition from the aviation leisure industry is unfair because it pays no fuel taxes and thus receives heavy indirect subsidies. The resulting air fares are artificially low, in relation to road/rail transport, and have diverted UK holiday makers abroad, thus damaging domestic holiday businesses severely.

## Fuel Tax

One important indirect subsidy to air transport takes the form of zero taxation on fuel. In comparison, other forms of transport incur heavy taxes on fuel. For example, vehicle drivers have to pay excise duty of 48.82 pence per litre on unleaded petrol (not ultra low sulphur) and 51.82 pence per litre in excise duty on conventional diesel. Moreover, Value Added Tax is payable on top of the excise duty as part of the fuel price. Thus a motorist in the UK pays about 81% of the fuel price as taxation. Such taxes may be justified if they internalise road maintenance costs, pollution costs and reduce the congestion (or even the gridlock) which would arise in the absence of fuel taxes.

If airlines were taxed in a similar fashion, their total costs would increase by about 42%, given that fuel costs are about 10% of total costs, as explained in Box 1. If air fares were increased by 42% to cover fuel taxation, air traffic could decrease by 42%, using the Department's estimate of the price elasticity of air traffic of minus one. The small income elasticity of around 0.6, together with increasing average real income of about 2.5% per annum, would not be sufficient to offset this. If air traffic decreased over the next 30 years, there would be no need to spend vast sums of money on extra runways or airports. If there is an excess demand for flying now, should it be met by increasing airport capacity, or by increasing prices through indirect taxes, or by some combination of both measures?

At the moment, however, the Chicago Convention prohibits taxes on fuel used in international aviation, though the Government is supporting moves through the International Civil Aviation Organisation to remove the exemption of such fuel from taxation. Until a new agreement is reached, it is useful to estimate the effects of fuel taxes on the demand for airport capacity before reaching any decision on such large long term

**Box 1. The price of fuel**

Denote the total costs of an airline as  $C$  where

$$C = 0.1 C + 0.9 C$$

decomposes  $C$  into fuel and non-fuel costs (fuel costs amount to 10% of total costs)

Motorists pay the following price,  $P$ , per litre of fuel:

$$P = (F + 48.82) * (1.175)$$

where  $F$  is the basic price excluding duty and VAT, **Duty** = 48.82 pence & **VAT** = 17.5%

Suppose  $P = 74$  and solve for  $F$  to obtain  $F = 14.16$

Hence the motorist pays  $(74 \div 14.16) = 5.226$  times the basic price of fuel as a result of tax.

Impose the same burden on airlines and we have new total costs  $C^*$ , given by:

$$C^* = (5.226)(0.1) C + 0.9 C = 1.4226 C$$

So total costs increase by 42.26 %. Different results can be obtained by using different values of  $P$ , or different fuels with different duties, but the fundamental point holds: the imposition of tax burdens on airlines similar to those imposed on other forms of transport would result in substantial increases in airline costs and fares. In its sensitivity analyses, the Department for Transport (2000) assumed that all the increase in fuel costs was passed through to fares and this assumption was used in section 2 of the present paper.

In practice, the proportionate increases in fares would vary between the nineteen different market sectors identified by the Department. The number of airlines in each sector is small enough to foster strategic behaviour in pricing policy and the different price elasticities of demand for leisure ( $-1.3$ ) and business ( $-0.5$ ) traffic would provide further scope for differential fare increases. The precise increase in fares, following an increase in costs, would vary between different airlines according to their different pricing policies. Competition in terms of quality of service rather than in price might well lead to 'no-frills' airlines increasing their market share. While it is not possible to predict the exact average increase in fares following a 42% increase in costs, it is safe to conclude that it would have to be substantial, if the airlines are to stay in business. The resulting decrease in traffic would make investment in new runways uneconomic. That is, investors in such schemes would lose money, unless a future government changed the present policy of no public funding for airport extensions and came to their rescue.

investments.

The Department's forecasters considered a 10% tax introduced in 2006 which increased to 100% by 2015. This was discussed in the context of internalising the pollution costs created by carbon dioxide. For purposes of comparison, a 10% tax on unleaded petrol would be about 1.4 pence per litre and 100% would be about 14 pence per litre. In contrast, the duty on unleaded petrol is 48.82 pence per litre and VAT is a further 17.5% on the retail price. Clearly, the official forecasters assume that there will be no attempt over the next 30 years to create a level playing field in transport competition by equalising the fuel tax burden. They may well be correct. If they are wrong, all their forecasts of future traffic will be too high. Wrong forecasts lead to wrong investment decisions, which can be very expensive for investors.

**Airport Charges**

Air passenger duty can be used until aviation fuel taxes are introduced. At the moment this duty is levied

on the carriage from UK airports of chargeable passengers on chargeable aircraft. It could be extended to include freight, which is becoming increasingly important. It could also be extended to include passengers and aircraft arriving at UK airports; some holiday makers depart by sea and return by air so that passenger duty is excluded from their cruise package. These are useful untapped sources of revenue for any hard pressed Chancellor of the Exchequer.

Further extensions of airport charges could cover the pollution costs of the emissions from aircraft engines. Whitelegg and Williams (2000) summarise an important 1998 study by the Dutch Centre for Energy Conservation and Environmental Technology which recommends charges for the emission of carbon dioxide and nitrogen oxide. These could be levied on all aircraft departing or arriving at airports in the European Union. Such charges are not banned by the Chicago Convention and are consistent with the 1992 Treaty of the European Union which states that polluters should pay for environmental damage. Such

charges are being considered by the EU and would require only a qualified majority (not unanimity) in the Council of Ministers to be adopted.

Such charges on fuel outputs could be made equivalent to the banned taxes on fuel inputs. Any non-EU country wanting to introduce emission charges could share the revenue with the EU Member State with which it has agreed routes. Equal shares would be attractive to the relevant finance ministers, especially if they followed the UK example of heavy taxation on fuel used in other forms of transport. A substantial increase in airline costs would lead to a substantial reduction in air traffic. The official forecasters in the Department for Transport simulated the effects of only a very small increase (7.5%) in costs which led to a small decrease (7.5%) in traffic. However, if they had simulated a large increase in costs in their model, they would have obtained a large decrease in traffic.

Emission charges could be added to the existing Air Passenger Duty. In addition to generating extra revenue for the Treasury, they would provide extra flexibility to policy makers. For example, the charges on night time departures and landings could be sufficiently high to discourage them. If night time movements decreased, the extra charges would be very popular. If the official econometric estimates of price elasticities are wrong and night time movements are not reduced, then the extra revenue could be used to increase the grants by the Central Government to local authorities surrounding the airports, thereby providing some compensation for aircraft nuisance through lower Council Taxes. The introduction of emission charges appears to be a win-win policy which all governments are likely to find attractive. The official forecasters may well be wrong in ruling out the equalisation of the indirect tax burden across different transport sectors. Their forecasts of future traffic are extremely important because they have such a large effect on estimated future capacity requirements. If they overestimate future traffic by a substantial amount, because new airport charges are introduced, seriously wrong investment decisions will be made.

**Figure 1. Airports & potential airport sites identified in the South-east England aviation consultation**



### Auction of Slots

The allocation of slots at airports is regulated by the European Commission. The UK Government wants slots to be auctioned and is trying hard to persuade the Commission to change its regulations. Under a system of auctions, airlines would bid for slots at different times at different airports and secondary trading of slots would be made transparent. In short, the market would solve the allocation problem. For example, slots at Heathrow would be expensive while those at Cliffe on the Thames estuary (if this proposed new airport for London is built) would be cheap and encourage airlines to go there. The costs of auctioned slots would be passed on through increases in air fares which would reduce traffic, especially leisure traffic at expensive airports.

The official forecasters did not simulate the effects of auctioned slots in their forecasts. It is dangerous to assume that such auctions will not take place in the next 30 years. All future governments will be aware of the successful auction of licences for the third generation of mobile telephones and are likely to favour similar procedures for the auction of slots. Existing slots have been allocated to airlines without competitive bidding, but there is no reason why such historic practices should continue. Since slots are

public rather than private property, the proceeds would accrue to the Treasury, following the precedent of the auction of third generation mobile telephones.

### Outlook

The Government's decision to consult people on the proposals to increase airport capacity is highly commendable. However, the most important consultee is the Government itself. Is it prepared to assume that aviation fuel taxes will never be introduced by future governments in the UK? Will future governments increase airport charges to cover externalities, or to make the tax burden on different forms of transport more equal? Will slots be auctioned in the next 30 years? Answers to these questions are vitally important to investors in extra airport capacity.

In the absence of answers to these questions, the Department has adopted the central forecast that capacity requirements will increase by 4.25% per annum because air fares are assumed to decrease by 1% per annum. Indeed, as the result of 'no frills' or low cost airlines, air fares might decrease by 2% per annum in which case the central traffic forecasts would have to be increased by 20%. If such price decreases are not outweighed by future taxes and charges, demand will increase and exceed present capacity.

In principle, this excess demand could be removed if airlines increased their fares. While the resulting increase in profitability would be welcome, there is always the danger that the Government would respond by reducing their indirect subsidies i.e. by imposing taxes and charges.

Government policy is also crucial to the funding of any extension of airport capacity. The Department for Transport (2002, para 15.3, p 111) states that the Government does not expect to commit public funds to finance any future airport project. If private investors are to provide the finance, they will want to have some idea of the scale of future increases in taxes, levies, charges, etc., which would have such a dramatic effect on the demand for extra capacity. Any estimate of the Net Present Value of an investment in extra capacity, based on the assumption of no significant change in taxes, etc. over the next 30 years, would have to include a high risk premium in the discounting of future returns. As an example, we may consider possible investment in a new freight airport at Alconbury, operating for 24 hours a day.

### Freight & Night Flights

Air freight in the UK doubled between 1989 and 1999 and is forecast to grow even more rapidly in future. About 70% is now carried in the holds of passenger aircraft but in future dedicated air freighters will carry an increasing proportion. Firms carrying express parcels want 'next day delivery' and require an airport with 24-hour operation. i.e. they

want aircraft movements all through the night. In the year 2000 there were 13,000 air freighter movements at the four London airports between 2200 and 0600. By 2030 some 40,000 night-time movements are likely to be wanted. It is proposed to construct a new 24-hour runway at Alconbury, near Huntingdon, on the grounds that there are not too many people there to oppose night-time flights.

There is likely to be very strong opposition from local MPs and other area representatives which private investors would have to bear in mind when deciding whether to finance such a project. Any future closure of the new runway during the night, as a result of community groups successfully lobbying Parliament, would severely reduce investment returns.

In addition to the standard arguments on pollution and noise, opponents would probably stress the fact that air freighters use untaxed fuel, whereas competing road hauliers using the Channel Tunnel have to pay substantial taxes on their fuel. If air freighters had to pay 51.82 pence per litre in excise duty (plus 17.5% VAT) for their fuel, air freighters would have to increase their freight rates and the demand for their services would be reduced. Of course, such taxes cannot be introduced at the moment because of the Chicago Convention, but an equivalent sum in the form of emission charges could be imposed. Such a policy would create a more level playing field in transport competition. In any case, road haulage would be required to serve Alconbury and its customers, so road haulage firms might well argue that they could provide a superior service (without transshipment) from many towns across the Channel by using the tunnel, if they did not have to pay fuel duties and VAT.

In short, it is not difficult to imagine those opposed to Alconbury persuading Parliament to ban operations between 2200 and 0600 hours. This could make any investment in such a project unprofitable. Investing in an indirectly subsidised industry may be fine in the short run because investors benefit from the subsidy. In the longer run, it may be disastrous when the subsidy is withdrawn. These lessons for private investors are highly relevant to the various proposals to extend airport capacity in the rest of South-east England.

### Options for South-east England

When appraising various proposals for extra airport capacity in South-east England, the Department for Transport (2002) assumes that there will be ample capacity in the rest of the country until 2030 (para 14.4, p 102). It provides an extensive discussion of proposals for a new runway at Heathrow, one to three new runways at Stansted, a new runway and realignment at Luton, a new hub airport at Cliffe with up to four runways, and various other

developments at other airports including Alconbury.

The Department stresses the advantages of hub airports, which attract many passengers connecting from one flight to another, and which provide more frequent flights to more destinations. The benefits to leisure and business traffic are listed but there is no discussion of whether passengers would be prepared to pay the extra costs of a new hub airport in South-east England rather than to take a feeder flight to Paris. Indeed, would a new hub airport provide a competitive rate of return to private investors, bearing in mind that public funds will not be available?

A new hub airport at Cliffe would be a massive investment project and it is likely that BAA plc would have to seek finance from the capital market. The same is probably true for the new runway at Heathrow, which would provide BAA plc with a huge compensation bill and massive expenditure on infrastructure, including putting the M4 spur and A4 roads into a tunnel. It might be possible for BAA to finance a cheaper project, such as a new runway at Stansted, from undistributed profits generated by increased landing charges or more shopping malls. Even so, the directors of BAA plc would have to consider the alternative uses of such funds, so rates of return and risk would still be relevant.

The exclusion of public funds rules out investment projects based on prestige rather than on rates of return. There is no point in comparing the prestigious Charles de Gaulle airport in Paris with a privately financed airport in the UK. While a new hub airport at Cliffe might not attract sufficient private finance at the moment, it is possible that a future government might provide public funds as part of a public programme to regenerate the Thames Gateway. It would also enable aircraft to avoid flying over London, thereby reducing the risk of a disastrous crash on a heavily populated area.

The proposed new runway at Heathrow involves removing about 260 residential properties, one Grade I listed Tithe Barn, one church, eight Grade II listed buildings, 25% of the Harmondsworth Conservation Area and 230 ha of Green Belt in addition to putting the A4 and M4 spur into a tunnel. This project is very large scale, which is why BAA plc would probably have to go to the capital market to finance it. The new runway would be small and could be used only by small narrow-bodied planes. The political resistance to such a project would be formidable. In these circumstances, private investors would have to consider whether the extra revenue generated would provide a satisfactory return on their investment. They would probably prefer to invest in projects which do not involve such large and expensive alterations to the landscape. A new runway at Stansted and the proposed modifications at

Luton fall into this category. Even if they are less expensive than the Cliffe and Heathrow projects, they still might not attract finance from private investors.

A subsidiary of BAA plc owns Stansted airport, and Luton Borough Council owns Luton airport. Whether they are prepared to provide the private finance is crucial. If BAA plc is prepared to finance an extra runway at Stansted while Luton Borough Council is not prepared to fund modifications of its airport, then the choice falls on Stansted. If the investment at Stansted proves to be unprofitable, possibly because of the future 'charges, auctions and other mechanisms' mentioned by the Department for Transport (2002, para 15.15, p 113), then BAA plc and its shareholders will suffer. The investment decision is theirs.

### Conclusion

The Department for Transport believes that, at current levels of air fares, there is an excess demand for airport capacity, particularly in South-east England. It does not discuss the use of higher air fares to remove this excess demand, though it does refer to better price signals to airlines and passengers (para 15.15, p 113). In principle, increases in air fares could be implemented by imposing taxes on fuel, increases in air passenger duty and emission charges, and by passing on the extra costs resulting from the auction of slots. Such increases could be justified by internalising pollution costs and by creating fair competition with other forms of transport.

Presumably, the Department does not consider using the price mechanism to remove any excess demand because it assumes that no government will adopt such policies in future. This assumption is dangerous. If it is wrong and if air fares increase substantially, then the demand for airport capacity will fall. In which case the proposed investment projects would be unprofitable. Private investors rather than the general taxpayer would have to bear the losses, because the Government rules out the use of public funds.

The restriction of finance to private investors simplifies the choice between the different investment proposals. For example, if private investors are willing to finance a new Charles de Gaulle airport at Cliffe (assuming planning permission is granted) then the project should go ahead. All the detailed advantages and disadvantages would be examined at the planning inquiry and the granting of planning permission implies that the advantages are thought to outweigh the disadvantages.

Of course, even if planning permission is given for a particular project, it does not follow that the investment will take place. Private investors might prefer to invest in projects other than those which increase airport capacity. The attitude of private

investors is all important. The Department for Transport issued a questionnaire to ascertain public opinion on its various proposals to increase airport capacity. It did not contain questions such as 'Would you be prepared to invest your money in any of these projects? If so, which project? How much would you invest? What return would you require before undertaking an investment?' Such questions would concentrate the minds of respondents to the questionnaire and would help the Department to assess the strength of public opinion in favour of a particular project. It is all too easy for questionnaire respondents to vote for a prestigious new hub airport at Cliffe if they do not have to pay for it.

If private investors have to finance extensions to airport capacity, they are likely to require such high risk premiums on the massive projects at Cliffe and Heathrow that the required finance would not be forthcoming. The less expensive projects at Stansted and Luton stand a better chance of obtaining the required finance. Whether even these more modest projects would be profitable depends on the reliability of the Department's air traffic forecasts. In turn, the accuracy of such forecasts over the next 30 years depends on future government policies on fuel taxes, airport charges and auctions of slots. The likelihood of such policies will be included in the risk premium

attributed to each project by private investors and it is possible that they would not be prepared to finance either the Stansted or Luton proposals. In the event of such a clear failure of the market testing of such projects, it would be very difficult for any future government to change policy and provide public funds for them.

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## Letter in response to the Editorial on London's congestion charge, Volume 8, Number 4 (2002)

### Simon Norton

The London Congestion Charging scheme is certainly an excellent start but it must be seen as only a start.

Perhaps the biggest priority should be to broaden it to other areas, starting with the rest of Central London (as I understand is being considered), but eventually extending to wherever traffic exceeds the environmental as well as the physical capacity of the road network.

However, we also need to deepen it by seeking higher traffic reductions than the current 20% or so. Has anyone done any studies into how much car traffic is actually essential to the life of cities and how much could be transferred to other modes if suitably developed? I would hope that traffic could be reduced to (not by) 20% of pre-congestion charge levels.

For a start, let's use the reduced traffic levels not to

increase the speed of motoring but to reallocate space to cyclists, pedestrians and buses. Let's aim to reduce traffic to levels where ordinary cyclists can come out without having to put up with the stress that afflicts them at present, where pedestrians don't have to be shunted aside to allow traffic to pass at capacity levels. And would it be possible to create a comprehensive network of bus lanes so that bus passengers were unaffected by traffic?

I am sure that this, together with the provision of alternative routes for extraneous public transport users, could be achieved for far less than the cost of new underground lines to allow public transport users to travel in reasonable comfort without being delayed by road traffic.

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