



Aviation and the Environment: Using Economic Instruments

Final Report to the Royal Society for the Protection of Birds

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1. Introduction

Background

In March 2003, the UK Treasury and Department for Transport (DfT) published a paper entitled *Aviation and the Environment: Using Economic Instruments*. The paper is to form the basis of discussions with stakeholders on the use of economic instruments to encourage the aviation industry to take better account of its environmental impact and, where appropriate, to take action to reduce this impact. The Government will take account of these discussions when it presents its views on the future of aviation in a forthcoming White Paper.

As part of the stakeholder discussions, the Royal Society for the Protection of Birds has been asked to attend stakeholder meetings based on the paper. In light of this, RSPB asked IEEP to produce a report to comment on some of the basic assumptions of the paper and discuss the range and possible impact of a number of economic instruments that could be used to encourage the aviation industry to reduce its adverse environmental impact.

Global and Local Impacts

This report focuses primarily on the global impacts of civil aviation, through its distinctive impact on the upper atmosphere. There are however also major local impacts such as noise and air pollution around airports, land use changes, etc arising both directly from aircraft movements and from secondary sources, such as surface access to the airport, and the vehicles and installations in the airport itself.

To a first approximation, any measure which affects the overall level of aviation activity will have a similar effect on both the global and local impacts. Beyond this, however, the relationship between the two is not strong or clear-cut. It is therefore important that any scheme designed to reflect all the main environmental impacts of aviation should include both global and local impact components, as measures which tackle only one element might have perverse effects elsewhere.

2. Comment on underlying assumptions

Radiative forcing

The paper issued by the Treasury and Department of Transport assumed that the radiative forcing index (RFI) of aviation emissions on climate change is 2.7. This is the figure quoted for 1992 by the Intergovernmental Panel on Climate Change (IPCC)¹, as the Government's paper acknowledges in Annex B (which is supported with a quote from Professor David Lee of Manchester Metropolitan University). The IPCC estimated that this figure would be in the range of 2.2 to 3.4 by 2050 depending on the scenario.

The Royal Commission on Environmental Pollution (RCEP) concluded that aviation's RFI is around 3 and argued that the IPCC underestimated the impact of aviation on climate change². Given the range of uncertainties in the IPCC figure – most of which tend to point towards a higher rather than a lower value – and the fact that the effect of cirrus clouds has thus far had to be omitted, it would seem prudent on a precautionary basis to adopt a higher value such as that proposed by RCEP.

Cost of carbon

The Treasury/DfT paper uses an illustrative cost of *carbon* of £70 per tonne rising by £1 per tonne per annum³. CE has reviewed the range of estimated damage and prevention costs and obtained a range of a few € to €100 per tonne of *carbon dioxide (CO₂)*, but chose a working value of €30 per tonne⁴. This is equivalent to the figure put forward in the Government's paper. However, as CE identified, there are a number of estimates that suggest that the figure is somewhat higher than €30 per tonne.

In summary, the radiative forcing index chosen by the Treasury/DfT is that chosen by the IPCC, which the RCEP argues is an underestimation. However, the choice of the cost of carbon is consistent with a recent review of the external costs of aviation, although higher estimates do exist.

3. Experience with using economic instruments to tackle the environmental impact of aviation

The use of economic instruments to address the environmental impacts of aviation is not common. Part of the problem is that, as the Treasury/DfT paper points out, the Chicago Convention, which is the fundamental treaty on international civil aviation, prohibits the imposition of taxes or charges on fuel *kept on board aircraft* and consumed on international flights. This is often misunderstood to mean that taxes on aviation fuel are prohibited by international law, but this is not the case. The Chicago Convention does allow for taxes and charges to be applied on fuel used on domestic flights and on fuel stored at the airport before it is loaded onto an aircraft. Indeed, the US, which has a large domestic market, imposes a tax on the use of kerosene for domestic flights⁵. In spite of its relatively low level of \$0.044 per gallon and the fact that the revenues are effectively earmarked for the development of the industry via the Airport Infrastructure Trust Fund, the existence of such a tax in the US underlines that taxes can be applied on fuel used on domestic flights. However, as noted by the Treasury/DfT paper, bilateral Air Services Agreements (ASAs) between specific countries

¹ *Aviation and the Global Atmosphere 1999*, IPCC

² *The Environmental Effects of Civil Aircraft in Flight* November 2002, RCEP, paragraphs 3.35, 3.41

³ Based on the discussion of a Working Paper from the Government Economic Service

⁴ *External Costs of Aviation 2002*, CE

⁵ IPCC (1999); *Aviation and its Impact on the Environment 1999*, T&E

often go further than the requirements of the Chicago Convention and therefore some of these may impose further restrictions on the use of taxes in aviation.

However, there are some examples of taxes and charges being applied to aviation in Europe for environmental reasons. Zurich airport has operated a system whereby an emissions surcharge, based on the relevant ICAO certification, is added to the landing fee of an aircraft⁶. The charge was introduced to encourage airlines to use their cleanest aircraft when using the airport and to accelerate the use of the best available technology. Its revenues are used to fund emission reduction measures at the airport. At the same time, the weight-based landing fee was reduced to ensure that the charge remained revenue-neutral for the airport. The charge has been effective, in that airlines are using less polluting aircraft at the airport than previously was the case with the percentage of aircraft paying no fee, ie those in the cleanest class, rising from around 55 per cent in 1997 to about two-thirds in 2002⁷. In 1998, Sweden introduced a similar tax at a number of its airports – again to ensure that the tax remained revenue neutral, landing fees were reduced appropriately⁸. Finally, in 1995 Norway introduced a ‘green tax’ on domestic tickets for those routes where rail offered a suitable alternative, as well as for all international flights⁹. The revenues are not earmarked. In 1999, Norway also introduced a CO₂ tax on kerosene for all domestic and international flights, although it later withdrew the tax relating to international flights under pressure from the aviation industry and neighbouring countries.

4. Existing aviation charges in the UK

In the UK, there are no existing environmental charges on aviation, but there are other levies or charges that airlines have to pay. On 1 November 1994, the Government introduced the Air Passenger Duty (APD), which is levied on the carriage of passengers from UK airports by commercial airlines¹⁰. When the then Chancellor Kenneth Clarke announced the introduction of the APD in the 1993 budget, he justified it on the basis that air travel was under-taxed compared to other sectors of the economy¹¹. The standard APD rate is £10 for most European destinations¹² and £40 for all other destinations; the rate is halved (ie £5 and £20, respectively) for the lowest class of travel on any flight¹³. The APD brings in around £900 million for the Treasury, each year¹⁴.

In addition, airlines also pay charges to airports and air traffic control providers for the use of their facilities. Airports levy a landing charge on airlines, which can be differentiated on the basis of the weight of an aircraft and/or the number of passengers. The rate of the charge is set by airport operators, so can vary significantly, although landing charges at the London and Manchester airports are regulated through a price capping formula set by the Civil Aviation Authority and the Monopolies and Mergers Commission. Charges are usually set to cover a contribution to the infrastructure costs, a passenger-handling fee and the costs of air traffic control at the airport. Airlines must also pay en-route charges for en-route air traffic control services, which depend on the time spent in any given sector of airspace. Such landing and

⁶ IPCC (1999)

⁷ Zurich airport’s website: <http://www.uniqueairport.com/environment/EN/umwelt-lufthygiene.htm>

⁸ T&E (1999)

⁹ *ibid*

¹⁰ Her Majesty’s Customs and Excise (2003) *Air Passenger Duty: Notice 550*; <http://www.hmce.gov.uk/forms/notices/550.htm>

¹¹ 1993 budget statement, quoted in Sewill (2003) *The Hidden Costs of Flying* Aviation Environment Federation

¹² From 1 November 2002, these include all EEA countries (ie the 15 EU Member States, Norway and Iceland), Switzerland, and the 13 countries which are candidates to join the EU; prior to this date, the lower rate only applied to EEA countries

¹³ HMCE (2003)

¹⁴ Sewill (2003)

en-route charges are also found in other European countries, as is the equivalent of the APD, in some form or another. Some airports also apply an airport departure tax (eg Toronto/Montreal) or an airport improvement fee¹⁵.

However, the UK is one of only three EU countries to exempt or apply a zero rating in relation to VAT for domestic passenger flights and is the only country to apply a zero rating¹⁶. This means that not only is no VAT levied on the purchase of aviation fuel and tickets in the UK, but that airlines can also claim back input taxes, eg VAT that they have paid on the purchase of aircraft¹⁷. This effectively means that the UK treats aviation more favourably in terms of VAT than any other EU country. Only the Netherlands and Germany apply their respective standard VAT rates (ie 19 and 16 per cent, respectively) to domestic passenger aviation, with the other ten countries applying a reduced rate¹⁸. On the other hand, no EU Member State applies VAT to either intra-community or other international flights. Finally, no duty is paid on purchases in UK airport shops for those passengers who are leaving the EU.

5. Studies on the use of economic instruments in aviation and the impact of aviation on the economy

OECD and ICAO studies

The IPCC has reviewed a number of studies looking at the potential impact of fuel taxes and environmental charges in the aviation sector¹⁹. A study undertaken on behalf of the OECD in 1997 concluded that, on the basis of historical data, increases in fuel price had little impact on demand, although the rate of energy intensity reduction was very responsive to price. Even though the study did not attempt to identify a direct relationship between fuel price and energy intensity, it concluded that an annual increase in fuel price of 5 per cent could result in a reduction in energy use by 2020 of up to 30 per cent compared to the baseline scenario. It concluded, however, that unless such a charge was introduced globally, it would distort competition and weaken incentives to develop and adopt more energy-efficient aircraft. Further, it suggested that the gradual increase in fuel prices was unlikely to have a significant long-term effect on air traffic growth.

Another report considered by the IPCC was a report of an ICAO working group from 1998. It concluded that the most effective options for reducing global emissions from aviation were a fuel levy and en-route charges. If cost increases were passed on to consumers there would be a reduction in emissions, as a result of lower demand, but action would also be stimulated in relation to the development and purchase of cleaner technology. If cost increases were passed onto airlines, however, the report concluded that their profitability might be affected and therefore their ability to invest in cleaner aircraft technology reduced. The report also looked at the impact of various ways of distributing the revenues. It concluded that a revenue-neutral charge would be simple administratively, but would limit the environmental benefits. Similarly, general taxation was feasible administratively, but the report considered there to be serious problems in relation to equity and acceptability of such an approach. It concluded that using the revenues to fund the development of cleaner technology was probably the best way to reduce emissions, but this was administratively complex and raised issues about equity and competition.

¹⁵ Personal communication with Tim Johnson (2003)

¹⁶ based on the response to a letter from Caroline Jackson MEP by transport Commissioner Loyola de Palacio

¹⁷ Personal communication with Alistair Hanton (2003)

¹⁸ Comparing the numbers in (16) with those in

http://europa.eu.int/comm/taxation_customs/publications/info_doc/taxation/tva/taux_tva-2002-5-1en.pdf

¹⁹ IPCC (1999)

Study on the taxation of aircraft fuel for the European Commission

A study undertaken for the European Commission²⁰ analysed a range of options in relation to the introduction of a tax of €245 per 1000 litres on aircraft fuel. These ranged from taxing fuel loaded onto all flights leaving EU airports, through taxing intra-EU routes only, to only taxing domestic flights. There were also variations for only taxing EU carriers. Not surprisingly, the more routes that were taxed, the larger the environmental benefits, where these were measured as a reduction in fuel consumption and emissions of CO₂. The study did not address the potential impact on future airline investment, eg investment in less environmentally-damaging aircraft, and in this respect it may have underestimated the environmental benefits. As discussed below, it may also have overstated some possible disbenefits.

Taxing all routes leaving EU airports was found to have more than twice the impact of only taxing EU carriers leaving EU airports. In turn, this option had approximately twice the impact of taxing intra-EU routes only, which in turn had around twice the impact of taxing only national routes. The associated reduction in consumer surplus mirrored the reduced environmental benefit. It was also not a surprise that those options that taxed only EU carriers adversely affected competition between these carriers and non-EU carriers, however these options had the advantage that there were no immediate legal obstacles as no amendments would have to be made to the ASAs.

For all options, the study concluded that there was some risk of tax avoidance through either tankering or changing routes, and that each option would have direct and indirect macro-economic impacts. The taxation of intra-EU flights only was the least vulnerable to tax avoidance with the taxation revenues declining by between 5 and 10 per cent as a result of fuel tankering. Taxing EU carriers only on all routes leaving the EU would lead to around a 10 per cent loss in tax revenue as a result of tankering whereas taxing all carriers on all routes leaving the EU and taxing only domestic flights would lead to losses in the order of 10 to 25 and 25 to 50 per cent, respectively. In relation to the macro-economic effects, the study concludes that all options would result in losses of operating revenue and jobs for EU carriers, whereas non-EU carriers would gain if they were not taxed. Taxing all carriers on intra-EU routes would result in a 7.1 per cent reduction in operating revenues for EU carriers and a loss of 2.6 per cent of their workforce, whereas taxing domestic routes only would lead to equivalent losses of 2.7 and 1.0 per cent, respectively. The economic impact of the other options on EU carriers would be significantly greater. In relation to indirect macro-economic effects, the study concludes that these 'are potentially large', but could be both positive or negative, so the net effect would depend on the assumptions taken in relation to the economic 'multipliers' of aviation compared with other economic sectors. Overall, therefore, the study did not come down in favour of any option, merely concluding that there was complexity underlying any decision to tax aviation fuel.

There are, however, several grounds for arguing that this analysis significantly overstated the potential economic and environmental disbenefits through tankering and/or diversion of flights which might arise from several of the charging options studied. These are as follows.

- It has been suggested that they overstated the extent to which tankering would be economically attractive²¹.
- They did not appear to take account of the threshold effect in tankering levels. That is, that a significant percentage of tankered fuel is expended simply in transporting the fuel, and this is in part a function of the distance over which the fuel must be

²⁰ *Analysis of the taxation of aircraft fuel* Study for the European Commission undertaken by Resource Analysis, MVA and the Dutch National Aerospace Laboratory (NLR), 1999

²¹ Based on personal communication with Mike Rossell, then of the European Commission's DG Tren

tankered. As long as the net post-tax price differential between fuel loaded at the point of departure and the destination remains below this percentage, no significant level of tankering will occur.

- As noted below, weight restrictions will also limit the extent of tankering.
- The study envisaged that a substantial degree of diversion would take place if a tax or charge were imposed – for example, that passengers would fly to airports in Switzerland, and then travel on by train or coach to destinations in southern France or Germany. However, there are already substantial differences in the cost of flying to different airports, yet the degree of diversion appears quite limited. This is presumably because diversion is not cost-free, and greatly diminishes the speed and convenience of a direct flight. As such, it seems that the scale of diversion might be much less than the study suggested.
- Equally, the study considered only a charge restricted to the area of the current EU15. This is clearly an unrealistic assumption for two reasons. First, any European charge scheme would almost certainly include both Norway and Switzerland, as both have a track record in this area and have indicated their enthusiasm for a European scheme. Therefore diversions such as that in the example above would not occur any more than it does at present. Second, the upcoming enlargement of the EU will mean that a traveller from the USA, for example, might need to fly to Ukraine, the Balkans or North Africa to avoid a charge based on destination.

Also, most of these adverse effects are in any case specific to a fuel charge; neither tankering nor major diversions are likely to occur in response to an overflying charge, for example.

CE study: Environmental Effectiveness

Dutch organisation CE was commissioned by the Netherlands Society for Nature and the Environment, in close cooperation with the European Federation for Transport and Environment (T&E), to undertake a feasibility study on the introduction of a European environmental aviation charge²². It considered the environmental impact and potential economic distortions of five options:

- 1) Emissions charge – where a charge would be levied on each kg of pollutant (CO₂, NO_x, etc) emitted in European airspace with the revenues distributed at the European level.
- 2) Revenue-neutral emissions charge – similar to Option 1, but the revenues return to the airlines.
- 3) LTO emissions charge – where the charge is based on emissions during landing and take-off (LTO) only.
- 4) Fuel charge package – a tax on the fuel bunkered at European airports corresponding to average emissions of CO₂, NO_x, SO₂ and water vapour emitted in use, combined with a LTO emission charge reflecting CO, VOC and NO_x emissions. This combination was chosen, as it was feared that a tax on bunkered fuel only was unrealistic and may have led to increased air pollution from VOCs and NO_x.
- 5) Movement-based ticket charge – a single charge on each intra-European ticket.

The study concluded that, in terms of environmental effectiveness, the emissions charge (Option 1) and the fuel tax package (Option 4) could reduce emissions by 30 per cent by 2025 compared to business as usual, which is effectively halving their expected growth. This assumed that the price of fuel, or an equivalent charge, could be gradually increased up to a level of \$0.20 per litre²³. The revenue-neutral emissions charge (Option 2) was only slightly

²² *A European Environmental Aviation Charge: Feasibility Study 2002*, CE

²³ Compared to the current average fuel price of around \$0.16 per litre. The charge level was based on a review of literature relating to the external costs of aviation, which revealed values in the range of

less effective (a 25 per cent reduction in emissions), while the other two options only delivered emissions reductions of between 8 to 12 per cent. Options 1, 2 and 4 yielded high environmental benefits, as it was considered that they would encourage an environmental improvement in numerous aspects of the industry, including aircraft technology and design, and load factors. The slightly lower impact of Option 2 resulted from the fact that this option hardly had any effect on the growth of air traffic. The study also noted that recycling the revenues back to the industry, as in Option 2, was not in accordance with the polluter-pays principle and could be seen to be unfair in relation to other modes of transport.

Of these options, tankering is an issue only for Option 4, as flying with excess fuel would not enable airlines to pay a lower charge if it was based on emissions, either those emitted in flight or in LTO, or passenger movements. However, the potential for tankering was taken into account in the assessment of the environmental effectiveness of Option 4. The study suggested that, in practice, only a maximum of around 10 per cent of an aircraft's fuel tank capacity might be available for tankering, as a result of weight regulations in EEA countries.

CE study: Economic Impacts

The CE study focused on the economic impacts between EU and non-EU airlines, airports and tourist destinations, rather than wider impacts on the economy. It estimated that, on the basis of a charge of between \$0.10 and \$0.40 per litre, the additional cost on a ticket for a 500km journey would be between \$1.50 and \$6.50, which would approximately treble for a journey of 2000km. It is worth noting that the figure for the shorter flight is between 4 and 20 per cent of the existing average airport charge in Europe and less than existing differences between airports. Based on an extensive background study into the potential economic distortions of a European aviation charge²⁴, the study concluded that there was no convincing evidence that there would be either a distortion in competition between airlines or between European and non-European carriers, as a result of the introduction of a European environmental aviation charge.

In relation to possible economic distortions between airports and tourist destinations, however, the study concluded that a fuel charge (ie the basic charge in Option 4) was around 2 to 6 times more vulnerable to economic distortions than an emissions charge in this respect. The potential economic distortions resulting from a movement-based charge was somewhere in between those of an emissions charge and those of a fuel tax. A fuel tax was considered more vulnerable than an emissions charge as the tax could be avoided by choosing an airport outside of Europe, whereas all aircraft flying over European airspace would be subject to an emissions charge. In relation to an emissions charge, the study estimated that the average increase would be around \$2 per passenger, which it argued would be insufficient to justify a departure outside of Europe in terms of the extra travel time that this would incur. With respect to the movement-based charge, it was considered that distortions would only take place at the margins, as it would only be avoided if a journey could be altered so that its both origin and destination airports were outside Europe. This could be undertaken for only a relatively small number of journeys.

CE study: Legal Issues

The report considers that there is no serious legal obstacle, ie in the context of the Chicago Convention and bilateral ASAs, to the introduction of either a movement-based charge, or an

\$0.14 to \$0.20 per litre; the assumption that achieving stabilisation of emissions might require a charge in the range of \$0.80 to \$1.30 per litre; and the conclusion that a tax equivalent to the EU minimum rate for diesel would be \$0.29 per litre.

²⁴ *Potential Economic Distortions of a European Environmental Aviation Charge: Background Study* 2002, CE

emissions-based charge in Europe. A question that arises in relation to the latter is whether the charge should be limited to emissions over national territory or whether airspace over large seas and oceans should also be included. The latter option would be preferable so as to deter most route changes that might result from the imposition of the charge, but is not clear whether the existing legal framework would allow such a coverage. In the case of a fuel charge, many bilateral ASAs would have to be amended. Whilst amending ASAs between participating European countries should not be a problem, it would also be necessary to amend those between European and non-participating countries, which could prove to be more difficult.

Taking all of these issues into account, therefore, the CE study identified an emissions charge as probably the most feasible option, while the decision as to who should benefit from the distribution of the revenues was left to the politicians. The study proposes that if it was decided that the revenues should be distributed to the airlines (Option 2) rather than used for other purposes (Option 1), then the emissions charge could be accompanied by the introduction of a further charge to take into account the negative aspects of this option, such as it not being consistent with the polluter pays principle. In this case, either a LTO emissions charge (in which the complementary charge would be amended to cover in flight emissions only) or a movement charge could be introduced.

Reports from the RCEP and IPPR

In its recent report²⁵, the Royal Commission on Environmental Pollution (RCEP) supported the introduction of a Europe-wide emissions charge, as opposed to a fuel tax, which would be levied on all aircraft taking off or landing at European airports. The charge would be differentiated by aircraft type, load and the distance travelled over Europe (including the distance to the half-way point over any ocean for flights to third countries). The RCEP recommended such a scheme, as it considered that it would be easier than implementing a fuel tax, which would require the renegotiation of the ASAs. In a paper from 2000, the Government suggested that the environmental costs associated with short-haul and long-haul journeys amount to around £3 and £20 per passenger, respectively²⁶. The RCEP concluded that a tax at such a level would have a negligible effect on passenger numbers, but that this should not be used as a reason for inaction.

The RCEP's report did not address the broader economic contribution of the aviation sector to the economy or the potential economic impact of any measures introduced to reduce the sector's environmental impact. However, in a discussion of the benefits of the air transport industry, the report did comment that the way in which any economic benefits would be affected by curtailing the growth in aviation would depend on how the growth was restricted, the quality of the transport alternatives available and how the resources displaced by this restriction were put to use. The implication being that curtailing the growth of air transport need not necessarily result in a negative economic impact.

In its report²⁷, the Institute for Public Policy Research (IPPR) also concludes that the UK should support an EU emissions charge, which should apply to emissions such as CO₂ (until this is covered by an international emissions trading scheme), NO_x and water vapour. Before the introduction of an EU-wide scheme, however, the IPPR advocates the introduction of an equivalent domestic charge. The report also argued for landing charges at UK airports to be differentiated to reward the least environmentally-damaging aircraft. In order to address congestion and ensure that the best economic use is made of the finite capacity of airports, the report also proposes that runway slots be auctioned and traded and that the government

²⁵ RCEP (2002)

²⁶ *Valuing the External Costs of Aviation 2000*, Department of Environment, Transport and the Regions

²⁷ *The Sky's the limit: Policies for Sustainable Aviation 2003*, IPPR

should encourage EUROCONTROL to consider the introduction of peak and off-peak charges to tackle congestion in the sky. It also called on the Civil Aviation Authority to abolish the practice whereby profits from retail activities subsidise landing charges, as a result of which airlines do not themselves pay the full costs of infrastructure and services.

The IPPR also reviews the economic arguments surrounding the aviation debate. In doing so, it draws heavily on the conclusions of the 1999 SACTRA report, which looked at the relationship between the provision of transport infrastructure and the economy²⁸. For the IPPR, the relevant conclusions of that report are:

- ‘Generalisations about the relationship between transport projects and economic growth are invariably simplistic, misleading and likely to exaggerate the overall benefits.
- The effects of transport on economic generation are strongly dependent on local circumstances.
- It is possible to “decouple” growth in transport from growth in the economy using appropriate policy instruments. In contrast to popular wisdom, cutting traffic growth could bring greater prosperity, while reducing the negative effects of congestion and environmental damage.’²⁹

While SACTRA’s conclusions apply to all modes of transport, to date they have been utilised in the debate on road transport, but have been absent in the general debate on aviation. The IPPR notes that the approach currently being taken by the Government in relation to aviation is akin to the approach taken towards road transport by the former Conservative government when they launched the largest road building plan ‘since the Romans’ in 1989.

The IPPR report underlines the fact that even Oxford Economic Forecasting (OEF), in a report that assessed the benefits of aviation to the UK economy³⁰, concluded that jobs would not necessarily be lost if aviation were constrained. Instead, the IPPR argues, there could be more jobs and GDP if aviation was constrained for a number of reasons. First, aviation currently benefits from tax concessions (see Section 4, above), which, according to an update of the figure quoted by the IPPR, amounts to £9.2 billion a year in the UK³¹. A recent report for the German Environment Agency estimated that the subsidy received by some European airlines amounted to 20 per cent of their respective operating revenues³². The IPPR concludes, therefore, that the value added to the economy by the sector’s growth could be overstated and therefore could mean that constraining the sector’s growth might actually increase national welfare. Those people that would not fly due to increased fares resulting from constraining demand would spend their money elsewhere, supporting different jobs and different forms of economic output in the process³³.

Second, the IPPR returns to the conclusions of the SACTRA report that ‘increasing the accessibility between two countries... may sometimes benefit one of them at the expense of the other’. To support this argument in relation to UK aviation, IPPR quotes Government figures, which show that three quarters of UK passenger travel is for foreign leisure flights and that the amount that UK tourists spend abroad is greater than the amount that foreign

²⁸ *Transport and the Economy* 1999, Standing Advisory Committee on Trunk Road Assessment, Department of Environment, Transport and the Regions

²⁹ IPPR (2003), Box 3.1, page 19

³⁰ *The Contribution of the Aviation Industry to the UK Economy* 1999 Oxford Economic Forecasting

³¹ Sewill (2003)

³² *Financial Support to the Aviation Sector* 2003 Umweltbundesamt (UBA), Berlin

³³ *Future Development of Air Transport in the UK: South East* 2002 Department for Transport estimates that prices could rise by an average of £100 a ticket if capacity is not increased

tourists spend in the UK. It notes that even the OEF's report accepts that dissuading some UK tourists from travelling overseas could support more economic activity than overseas visitors to the UK do. The IPPR disputes the Government's assertion that the current tourist spending imbalance will diminish, as the Government's own forecasts suggests that the gap between UK leisure flights abroad and foreign flights will continue to increase.

Finally, in relation to the impact of aviation on productivity, the IPPR notes that for business travel the expected £100 increase in fares resulting from no increase in capacity is relatively small compared to the expected financial return on a useful business trip. With respect to freight, increasing capacity and lower costs has meant that airfreight no longer focuses on the transportation of high value, light-weight products, as, for example, fruit and vegetables is now the largest import category accounting for 13 per cent of import cargo by weight. Consequently, the IPPR argues that increasing the cost of aviation will merely ensure that it is once again used principally for high value, light-weight produce, rather than being used as 'an excuse for bad supply chain management'.

Two other recent publications also focus on the relationship between air transport and the economy. The reports, for the North West Regional Group of the Campaign for the Protection of Rural England³⁴ and by HACAN ClearSkies³⁵, focus on the simplistic arguments surrounding the relationship between transport and the economy drawing extensively on the SACTRA report. Both cover similar ground to the IPPR as they emphasise the size and possible adverse effect of aviation's tax exemptions and the tourist spending imbalance. HACAN ClearSkies also counters Government arguments that increasing capacity would attract foreign investment by arguing that it would also attract UK investment overseas. It underlines this by presenting UN Conference for Trade and Development figures that show that the latter has exceeded the former in each of the last 10 years, a trend which could well continue if capacity was increased.

6. Discussion

From the above discussion, it is possible to draw two principal conclusions. First, *increasing the cost of air travel in some way can have benefits in terms of reducing aviation's environmental impacts*, particularly its emissions. Second, *there appears to be a convergence of opinion that, in the absence of a global agreement on a fuel tax, the most feasible and workable solution would be the introduction of a European aviation emissions charge*, preceded by a national charge in the UK. This appears to be administratively feasible, as the existing charging system for using airspace could be easily modified to take into account the number of extra factors necessary. CE's report concluded that such a charge would also encourage the development of cleaner engine technology and other environmentally-beneficial adjustments to aircraft and their operation.

Experience at Zurich airport suggests that the emissions charge there is having an impact on the type of aircraft using the airport, although in the short-term it is likely that airlines using Zurich and the Swedish airports that also have an emissions charge are merely transferring their more polluting aircraft to other routes rather than changing their purchasing decisions. If a national charge were to be introduced in the UK, a similar situation would probably occur for those airlines with the ability to move aircraft between routes. However, particularly if the international trend was towards the introduction of emissions-charges, there could well be a more significant impact on purchasing decisions in the longer-term. In this respect, it is important for the UK Government to signal its intention to address the environmental impact of aviation through the introduction of a charge of some sort, given the increasing prominence

³⁴ *The Economics of Aviation: A North West England Perspective* A report for CPRE North West Regional Group, 2003, John Whitelegg

³⁵ *It's the Economy, Stupid* 2003 HACAN ClearSkies

of the issue in other Member States³⁶ and the consideration that is being given at an EU level to the introduction of an EU-wide charge. In the short-term, the introduction of a charge in the UK would arguably result in less market distortion in the sector, as the application of the charge would go some way to compensating for the zero-rating for VAT from which aviation currently benefits. Furthermore, there are a number of reasons to argue that opponents of taxes or charges tend to exaggerate the adverse environmental or economic impacts which would occur. It is also worth noting that the introduction of an emissions-related charge could not be potentially avoided through tankering, and would diminish the incentive for diversion of destinations or flight paths.

CE argues that the introduction of an emissions charge would probably not result in any significant economic distortions between airlines or between European and non-European carriers and any distortion between those airports and tourist destinations on the borders of Europe and those just beyond would be minimal and could be addressed by other measures. Furthermore, these edge effects will become ever less significant as the EU enlarges. In relation to the wider economic impact of increasing the cost of air travel in such a way, the application of the conclusions of the SACTRA report, as discussed by the IPPR, suggest that this need not necessarily be negative and may indeed lead to economic improvements. The least that can be said is that the SACTRA conclusions emphasise that allowing growth in transport need not necessarily lead to greater prosperity.

For any charge, an associated political decision is whether to recycle the revenue back to the industry, to hypothecate it to environmental mitigation or to use it for other purposes. If the revenue from an emissions charge were to be recycled back to industry, to encourage the development of cleaner technology, for example, the charge could be complemented by a **charge on movements** or on **LTO emissions**. If the revenues were recycled in this way and a complementary charge was not introduced, the emissions charge would be counter to the polluter pays principle.

There are some advantages to be gained from the introduction of an LTO charge in parallel to an emissions charge whether or not the revenues of the latter are recycled back to the industry. An LTO charge could be varied to address the most pressing issues regarding local air pollution at the airport. In this respect, therefore, an in-flight emissions charge and an LTO emissions-related charge introduced together could be adapted to address both global and local pollution issues and could be varied according to the desired objectives of the charging system.

To encourage the use of cleaner aircraft, the government could also **differentiate landing charges** and even **en-route charges** to reflect the environmental impact of aircraft. The European Commission believes that the latter is consistent with EU law³⁷.

With respect to APD, this is already subject to minor differentiation, one dimension of which (ie the difference in duty for European and non-European flights) is a proxy for distance and therefore environmental impact. **APD could be further differentiated**, but it would be complicated to base such differentiation on the environmental characteristics of the aircraft. An alternative would be to further differentiate APD by distance. On the simplest level, such a differentiation could be between domestic flights and EU flights, whereas a more complex system could relate the duty directly to distance travelled. As distance is a reasonable proxy for environmental damage, differentiating APD in this way would ensure that passengers at least paid a charge in proportion to the environmental costs that their journey has helped to incur. However, the direct impact of differentiating APD in this way would be to affect the

³⁶ For example, see UBA (2003)

³⁷ Communication to the European Parliament in relation to the Council's Common Position on the Single European Sky Regulations

distance travelled by passengers rather than the purchasing decisions of airlines. On the other hand, as was noted above, increasing the cost of aviation in any way is likely to have a positive impact in terms of reducing aviation's environmental impact.

Finally, the favourable treatment given to the aviation industry in the UK compared to that in other EU countries with regard to VAT is particularly anomalous. The **introduction of VAT** for domestic flights would contribute to increasing the cost of travel to at least partially cover some of its environmental costs, as well as bringing the UK in line with most other EU countries and eliminating an existing market distortion.

The introduction of a **tax on fuel** consumed on flights or bunkered at airports is subject to a number of problems. There is some risk of tax avoidance through tankering in this case, although this is probably exaggerated. More important, such a tax would be subject to significant legal obstacles, as it is likely that ASAs would have to be renegotiated.

7. Summary

In summary, therefore:

- increasing the cost of air travel in some way can have benefits in terms of reducing aviation's environmental impacts, particularly its emissions; and
- there appears to be a convergence of opinion that, in the absence of a global agreement on a fuel tax, the most feasible and workable solution would be the introduction of a European aviation emissions charge, preceded by a national charge in the UK.

An emissions charge would be administratively feasible, would not be subject to potential avoidance through tankering, would not have adverse impacts on competition, and need not have negative impacts on the wider economy. Indeed the conclusions of the SACTRA report suggest that constraining transport growth could have a positive economic impact in some cases and it could be argued that the existing economic imbalances resulting from aviation make this such a case. The introduction of an emissions charge also has the potential to influence airlines' purchasing decisions in favour of less environmentally-damaging aircraft. It could be complemented by a charge on LTO emissions and even noise, which would have the added advantage that the charging system could be adjusted to reflect concerns relating to local air pollution as well as global impacts. The introduction of VAT on domestic aviation, at least, appears to be an anomaly that should be rectified.

Further differentiation of APD could take place, although as it would be difficult to base this on the environmental performance of aircraft, its environmental impact may simply be the result of increasing the costs of air travel rather than of encouraging the use and purchase of less environmentally-damaging aircraft. The introduction of a tax on fuel, either that consumed on a flight or that bunkered at an airport would be subject to legal obstacles and could result in some avoidance measures though fuel tankering and flight diversions.