Aviation Demand Forecasting

A response to the Airport Commission's Discussion Paper 01

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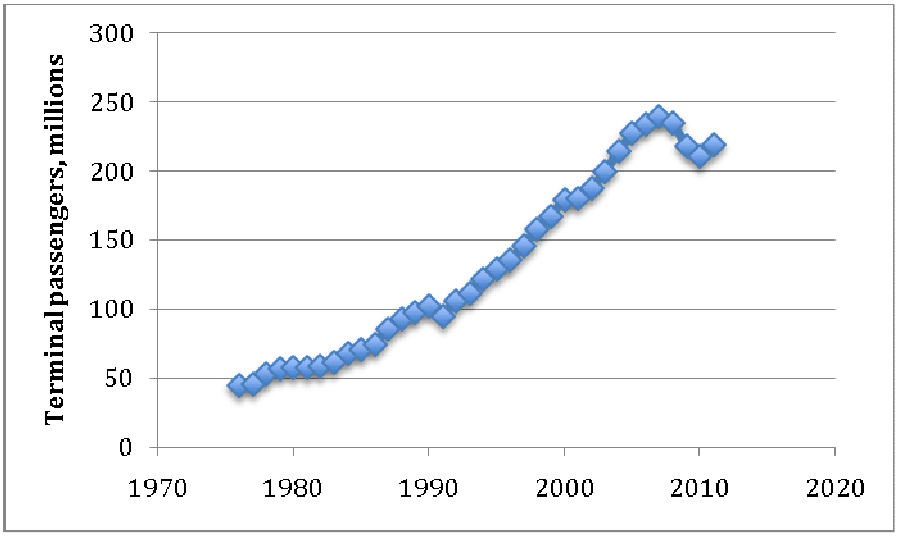
This paper suggests that the aviation market may be more mature than is generally supposed and that, accordingly, a 'low demand growth' scenario needs to be considered as one of a range of possible outcomes. A 'demand management' scenario is also proposed.

Cessation of growth of travel demand

Air travel has grown hugely since the 1970s. Passengers using UK airports increased from 45m in 1976 to reach a peak of 240m in 2007, since when numbers have fallen back, to 220m a year in 2011 (see Figure 1). The question is to what extent this break in the long-term growth trend is a consequence of the economic recession, as the DfT's Aviation Forecasts 2013 suppose, or to what extent it may reflect a maturing market that is approaching saturation of demand for air travel.

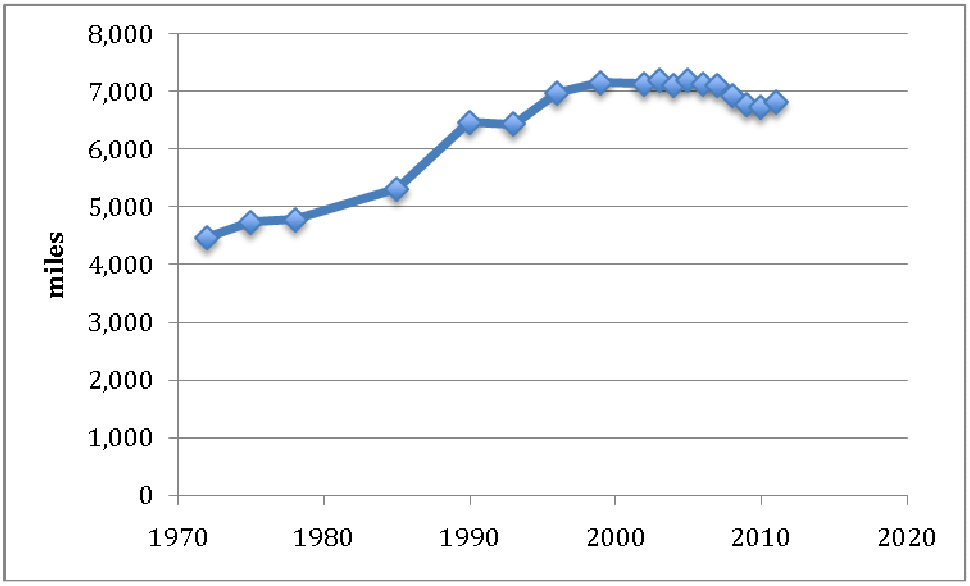
Analysis by FAA staff suggests that the US domestic market for air travel is nearing saturation on a per capita basis, expected at 2.4 enplanements per person per year compared with the 2010 average of 2.2. [i]

Figure 1 Passengers using UK airports: CAA data



Daily travel per capita in Britain and other developed economies has stabilised. In Britain, the average annual distance travelled (by all modes except international aviation) has settled at about 7000 miles per person per year since the mid-1990s (see Figure 2). This implies that the historic link between income and travel demand no longer holds. The plateau in the trend has been interpreted as reflecting saturation of demand for daily travel.[ii] It is to be expected that air travel by UK residents will likewise at some point cease to grow.

Figure 2 Daily travel, average miles travelled per person per year: National Travel Survey



Air travel growth can occur when existing passengers fly more often and/or when new passengers travel for the first time. It is usually assumed that in developed economies growth will predominately come from existing passengers, whereas in developing economies growth arises from new passengers, as the result of growing incomes and greater accessibility to airports. For this reason the limited research concerning market maturity of UK air travel has focused on considering the amount of travel undertaken by current regular flyers in the future.[iii]

Time constraints

Demand saturation may be expected to occur because of constraints on time or income, and the need to use these for other activities. Whilst the income effect has been partially considered with the use of declining income elasticities to reflect maturity, little consideration has been given to the time constraint.

Evidently, the time people have available limits the amount of travel. For daily travel, it is all the tasks to be done within the 24-hour day that limit travel time to an hour a day on average. For flying, it is time that can be spent away from

home or office, and the time available for vacations. An ageing population may mean more leisure time for the retired, but the worsening prospects for pension income may inhibit the growth of leisure travel. Weekend trips for city breaks tend to involve disproportionate amounts of time spent tediously at airports. The impact of time constraints on the scope for people making more trips is researchable through both qualitative and quantitative studies.

Little attention has been given to people who are presently not flying, or flying infrequently, and whether they might fly more regularly in time to come. In 2011, 57 million UK residents travelled abroad, of which 44m went by air, amounting on average to less than one return journey by air per person per year. However, surveys, including the National Travel Survey, show that over half the population do not fly in any one year – the 'infrequent flyers'. Frequency of air travel increases from lower to higher socio-economic status group, is higher with younger people and rises with income. Nevertheless, around a quarter of those in the top social group or in the highest income quintile took no flights in the previous year. The prospects for the growth of demand for air travel depend importantly on whether these 'infrequent flyers' are likely to change their habits in the future.

The group of infrequent flyers is heterogeneous. Some people have never flown; some fly rarely or occasionally; others regularly take annual holidays abroad but may have missed a year for a particular reason such as illness; and some may make a nil return in a survey because the interval between annual holiday trips is greater than 12 months. Some current infrequent flyers may have flown frequently in an earlier phase of life. Surveys of passengers using UK airports show that over the past ten years, less than one per cent of passengers are adults flying for the first time. This indicates that much of the UK resident growth in passenger traffic in recent years has come from existing passengers travelling more often. The implication is that of the infrequent flyers, those who have never flown may be unlikely to change their habits.

The future behaviour of the regular flyers and the infrequent flyers is important for understanding future growth patterns and the degree of demand maturity that must be a central consideration in planning future airport capacity. This aspect is disregarded in conventional econometric analysis used to inform growth projections, it being implicitly assumed that attitudes and behaviour do not change except where driven by model parameters such as income. The likely future behaviour of both regular and infrequent flyers is researchable, however, and needs to be investigated.

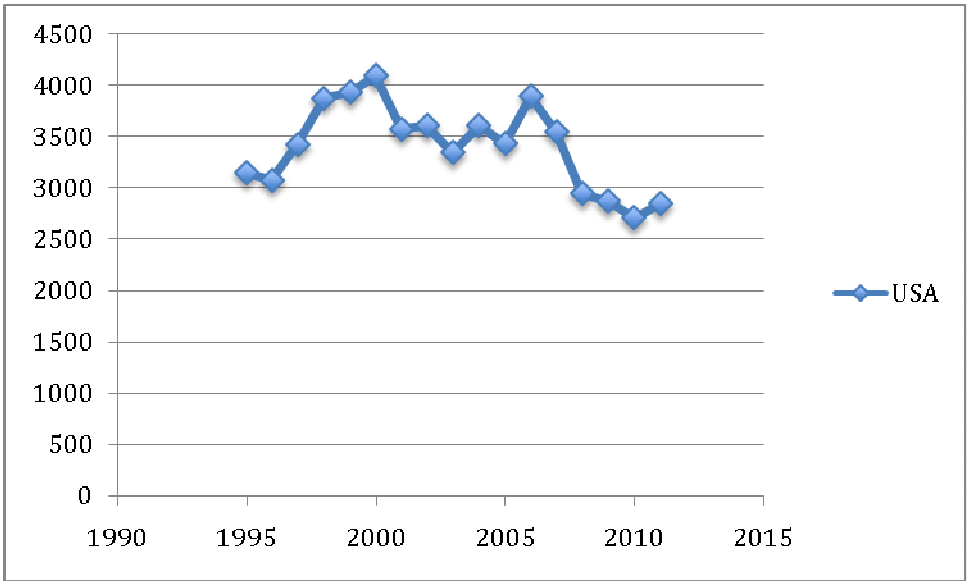
When thinking about future demand for travel, it is helpful to distinguish between per capita behaviour and population effects. It would be reasonable to allow straightforwardly for UK population growth when projecting future demand for air travel by UK residents. The main uncertainty is future growth of per capita demand for air travel.

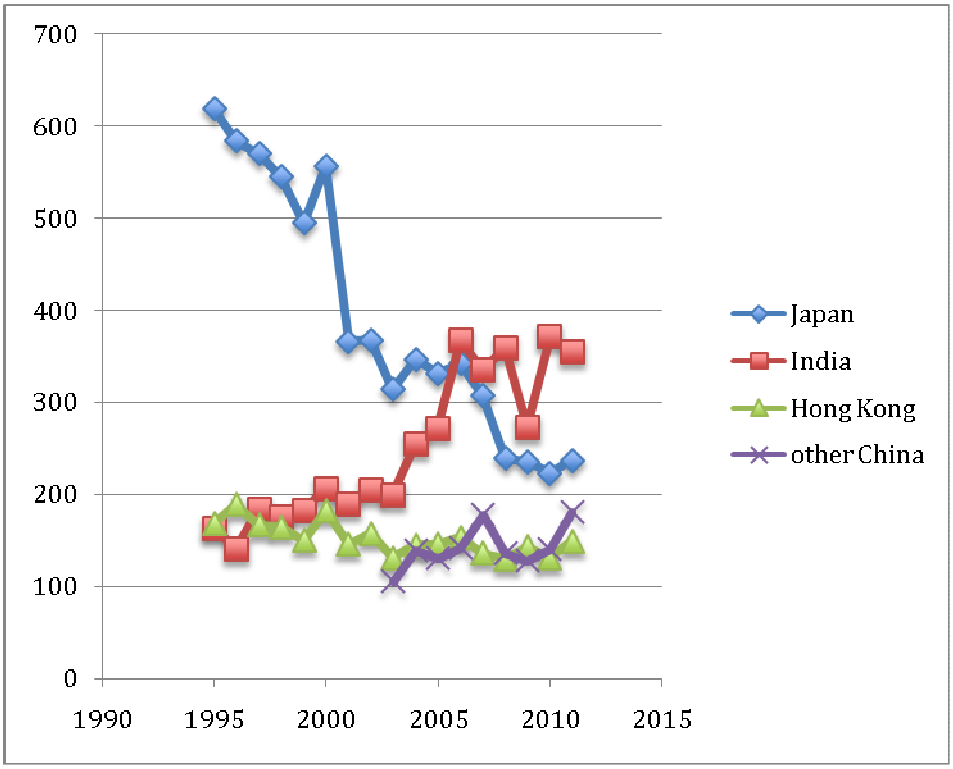
Inward travel

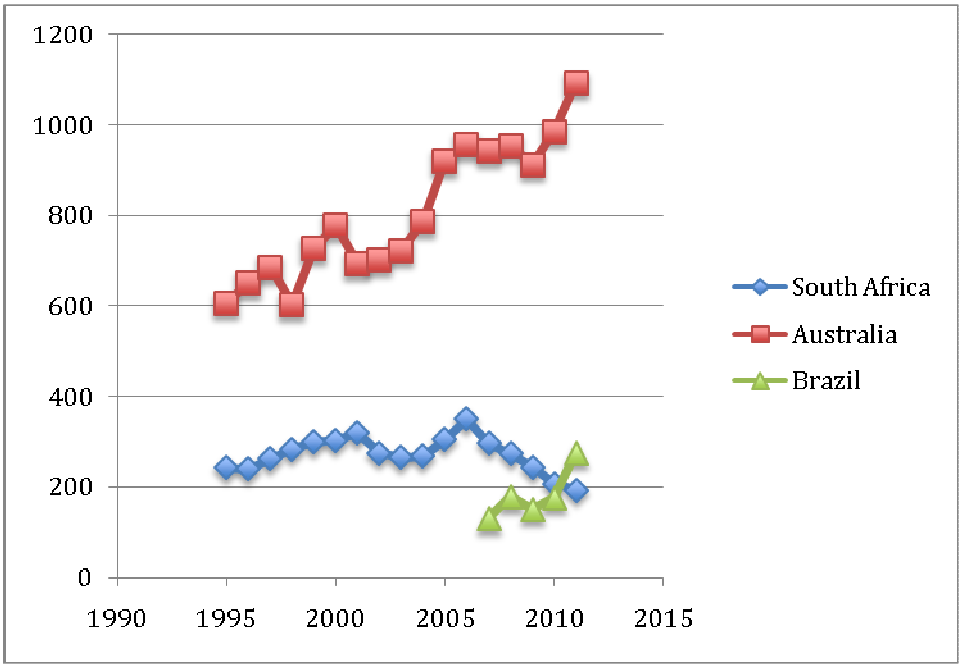
The growth of inward travel to the UK needs to be considered, both leisure and business travel, particularly by the growing middle classes of the developing economies who may wish to visit to the UK. Inward visits, currently 30m visitors a year, have doubled over the past 25 years, although spending at constant prices has remained surprisingly unchanged at about £10bn pa. Of the 30m, 7m are business travellers, 12m are on holiday, 9m are visiting family and friends, and there are 2m 'other'. London, the most visited city in the world, has over 15m overseas visitors a year, including 7.6m on holiday, together with some 5m visitors from within the UK.

The scale and trajectories of inward travel from overseas residents are quite varied, as Figure 3 indicates.

Figure 3 Visitors to the UK: International Passenger Survey (thousands)







The variety of profiles is noteworthy. Demand for travel from the US seems to have matured, possibly reflecting demographic and economic factors – the increasing Latino segment, and the lack of growth of middle incomes, consistent with the approaching saturation of the US domestic market mentioned earlier. Demand from Japan has contracted substantially, perhaps reflecting an ageing population and a flat economy. These demographic and economic determinants

would be worth investigating, to assess if and when they might apply to other markets.

The DfT Aviation Forecasts employ an aggregated approach to considering the demand for travel from overseas. One group for which demand is projected comprises OECD countries other than Western Europe. However, this group includes the US, Japan and Australia, which exhibit very different time trends. A disaggregated approach would be more informative.

There would appear to be considerable scope for growth of mass tourism abroad by the expanding middle classes of India and China. However, a potential constraint on inward tourism is the capacity of unique historic destinations in London to absorb visitors. First time visitors to the UK are almost certain to wish to visit London. Attractions such as the Tower of London and the main museums and galleries are already very crowded at times of peak demand and some underground stations are partially closed. Other historic European cities, such as Florence, seem to be functioning at capacity for much of the time. While hotel and retail capacity can be enlarged to meet demand, this is more difficult for unique visitor attractions. It would therefore be worth investigating capacity constraints in London, as perceived both by the managements of the sites and by the inward tour operators.

Low demand growth scenario

Considerations of both time constraints on UK residents and the scope for growth in inward tourism are relevant to the state of maturity of the UK market for air travel. The DfT's Aviation Forecasts 2011 includes a discussion of market maturity, incorporating a sensitivity in which faster maturity reduces demand in 2030 by 35m passengers pa compared to the central case, equivalent to about 10% of projected demand. The DfT recognises that maturity is hard to infer from historic data and that any conclusions that can be drawn from recent changes in the air travel market as to the existence of market maturity are subject to very high levels of uncertainty.

Given the importance of market maturity for future demand, it would be worth considering a scenario approach, as an alternative the standard forecasting with a central projection plus high and low variants. Scenarios have long been used by energy sector businesses to help address the implications of the impact of exogenous uncertainties.[iv]

A low aviation demand scenario might involve earlier maturity of the various market segments considered in the DfT forecasts, informed by the findings of research on the behaviour and expectations of both regular and infrequent flyers, and as regards inward tourism, as discussed above.

Such a scenario may be important for the robustness of the business case for any new runway capacity. In this context, it is not only the DfT's forecasts that matter, but also those made by likely investors and their advisors, given that

airports are for the private sector to develop. Consideration would need to be given to the likely competitive response by airports in the South East under separate ownership, and by European and Middle Eastern hubs, to the opening of additional runway capacity when demand growth is low.

It is worth recalling that the private sector consortium members that built the Channel Tunnel Rail Link (now known as HS1) lost their investment when passenger numbers proved to be far lower than forecast, due to the competitive response of the low cost airlines and the ferries. It is also worth bearing in mind that the proposal for a new nuclear power station at Hinckley Point gained planning consent in 1990, after a controversial public inquiry, but construction has not yet started because the expected income from electricity sales in a competitive market is judged insufficient.

A low demand scenario would be important when considering the finances of any proposed new runway capacity. There would be market risk which would need to be accepted, for instance by the holders of a significant tranche of equity finance. The CAA as regulator would need to permit charges that allow this equity to be suitably rewarded. Another possibility is some kind of government guarantee of minimum income.

Demand management scenario

One general approach to infrastructure investment is to predict future demand at forecast prices and to provide supply to meet that demand ('predict and provide'). This is appropriate for utilities – electricity, gas, water and telecommunications. It used to be the approach for roads until 1990, when the public resistance to new greenfield construction led to a change of policy – demand management, rather than predict and provide, with politicians recognising that 'we cannot build our way out of congestion'. There is now no attempt to meet unconstrained demand for car use. Rather, a variety of measures are employed to manage demand, of which the most explicit is road pricing, for instance as implemented in central London congestion charging.

Thirty years ago the population of London was declining as people moved out to towns beyond the green belt where offices with car parks were constructed for people who wanted to drive to work. The debate was whether road capacity could be constructed in London to accommodate demand for car travel, with Westway in west London and the routes connecting to the Blackwall Tunnel as initiatives in this direction that proved too damaging to the fabric of the city to pursue. However, despite the constraints on car travel, other factors have led to the economic dynamism and cultural vibrancy of London over the last two decades, attracting a growing population.

As a consequence of no new road construction in London, the number of daily car trips have held steady for the past twenty years. Because the population has been growing, car trips have been declining as a share of total travel, from 50% at the peak in around 1990, to 38% currently, with further decline to perhaps

30% on present population projections. Investment in, and use of, public transport has grown accordingly. This demonstrates that the relationship between travel behaviour, transport investment and economic growth is far from straightforward. Constraints on car use have been worked around, very largely by greater reliance on rail and buses.

Given the difficulty of agreeing a site for new runway capacity in the south-east, the uncertainty of future demand, as well as the potential difficulty of financing construction, it would be worth considering a scenario in which demand is managed to make the best use of existing capacity. How would we employ demand management to work around a capacity constraint to make optimum use of the system?

The key point is that leisure trips dominate air travel. Passengers on business trips are a minority at UK airports. Of all passengers, 12% are UK residents and 11% are foreign residents who are making journeys for business purposes. The three-quarters of airport users are travelling for leisure. Even at Heathrow, 70% of passengers are travelling for leisure rather than business. If it is the case that growth of business travel is important for growth of the economy generally, there is ample airport capacity for increased business travel by air, including at Heathrow, by displacing leisure travellers. Business travellers would generally be prepared to pay a price premium for a convenient airport. Ticket pricing based on yield management pricing allows this to happen naturally – the aviation sector's well-established form of demand management. Moreover, as demand increases, there is scope for utilising larger aircraft within the runway capacity constraint.

A market in landing and take-off slots, as is being developed, would facilitate preferential allocation to flights catering substantially for business travellers. BA recently acquired the BMI business, which gives it an additional 42 slots at Heathrow, to be switched to more profitable long-haul flights. Point-to-point flights for leisure purposes are shifted to airports with spare capacity, including regional airports beyond southeast England. This is a further form of demand management.

To illustrate the possibilities, consider scheduled flights to and from UK airports to Nice, France, a destination for both leisure and business travellers. Of the 1.5m passengers in 2011, those departing from the main originating airports are as follows: Heathrow, 536k; Gatwick, 324k; Luton, 146k; and Stansted, 91k. 12 other airports supplied a total of 430k passengers. It is likely that a large proportion of the 35% of passengers who flew from Heathrow were UK residents travelling point-to-point, and who therefore could therefore have used an alternative airport, and who indeed would have done so had a significant price differential existed. No UK resident on this route would need to use Heathrow as a hub. French residents might change at Heathrow for transatlantic flights, although they would have many other possibilities.

More generally, UK travellers usually have acceptable alternatives to Heathrow for short haul point-to-point flights, and also alternative hubs for transfer to

long-haul flights – at Paris, Amsterdam, Frankfurt and Madrid, for instance, as well as the growing hubs in the Gulf. Many passengers from Scotland and the north of England use these European hubs in preference to Heathrow. Moreover, it is often significantly cheaper to fly from London to a long-haul destination via a European hub than fly direct, allowing the leisure traveller to trade off the extra travel time and inconvenience against cost-saving. Pricing based on yield management allows use of European hubs with spare capacity to arise naturally.

An additional kind of demand management could happen if the charging regime for Heathrow were modified. While this is currently under review, the present arrangement is that airport charges per passenger are capped by the CAA as regulator at a level that allows the operator an appropriate return, taking into account the need for investment and the revenues from retail activities at the airport. The cap, intended to prevent exploitation of travellers by a dominant airport, prevents the raising of charges for demand management purposes, whether to shift leisure point-to-point travellers to other airports or to reduce the use of Heathrow at peak times to increase resilience.

Removing the price cap would result in windfall returns to the Heathrow operator, which it would be appropriate to share with the Exchequer by means of a levy or tax, for instance a tax on the value of slots, analogous to a property tax. An alternative approach would be to increase Air Passenger Duty for travel from Heathrow. HMRC has recently published an analysis of the effect of varying APD on demand at Heathrow and Gatwick. [v]

It would be desirable to develop a 'demand management' scenario in which the impact of the full range of demand management measures could be explored in capacity constrained situations, particularly the implications of building no further runways in the south-east. One impact would be the shift of point-to-point leisure travellers away from Heathrow. Another might be the displacement of the marginal passenger from air travel to another mode, for instance the stag and hen parties who take advantage of low airfares to spend weekends in Riga or Dublin, who might have an equivalent experience in Brighton or Bournemouth, with a gain to the UK economy.

Conclusions

There is uncertainty about future demand for air travel by UK residents and by those from overseas travelling to Britain. The possibility that the market is more mature than is generally supposed is not so remote that it should be neglected. An outcome in which demand growth was low and competition by airports for passengers was more intense has implications for the financing of new runway capacity. Accordingly, we suggest that a 'low demand' scenario be developed, as an aid to reaching conclusions on the Commission's preferred option.

The uncertainty of future demand for air travel could be lessened though market research directed at understanding:

- The time constraints on regular flyers that may limit them making more trips.
- The likelihood that the infrequent flyers will make more trips.
- The capacity of the unique visitor destinations in London to cope with more visitors and the views of inward tour operators about the scope for growth of numbers.
- The reasons why demand for travel from the US and Japan have ceased to grow or have fallen.

We expect that research to inform these questions could be conducted on a timescale and cost compatible with the Commission's work programme and have some specific proposals we could discuss with the Commission's staff.

A second scenario that we propose should be developed is one in which the full range of market measures are deployed to manage demand in a situation in which runway capacity is constrained – a 'demand management' scenario – since it is not obligatory to plan to meet all projected demand at current prices.

8 March 2013

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[i] Murphy, D. and Wells, M. (2010) *Is the US Domestic Air Travel Market Approaching Saturation? Theory and Evidence*, paper presented at Transportation Research Board January 2010. [unpublished paper obtained from authors]

[ii] Metz, D. (2010) Saturation of demand for daily travel, *Transport Reviews*, 30(5), 659-674.

[iii] DfT UK Aviation Forecasts 2011, Annex B, and Aviation Forecasts 2013 para 2.19 et seq

[iv] See for example www.shell.com/home/content/future_energy/scenarios/

[v] *Modelling the Effects of Price Differentials at UK airports*, HMRC Research Report No 188, October 2012.