Peer Review of a paper on key drivers of air passenger demand

1. Introduction

This is a review of the Department for Transport paper "Reflecting changes in the relationship between UK air travel and its key drivers in the National Air Passenger Demand Model".

This is of one of four reviews[1] produced for publication with the Department's aviation forecasts, in July 2011, of the processes leading up to those forecasts. These reviews are written to complement a final review of the forecasts document.

2. Coverage and authority of the paper

The Department's paper presents a clear and satisfactorily full and accurate story of how the Department has addressed those drivers of air passenger demand whose future impacts cannot be estimated by the analysis of past data on the effects of income and prices. As the paper acknowledges, many such factors may affect the number of passengers using UK airports in future decades, few of which are amenable to any useful, formal quantitative assessment. However two related factors do lend themselves to informed, quantitative judgement, namely market maturity and changes in rates of market liberalisation.

In considering market maturity the Department has employed academic consultants to investigate how other bodies producing aviation forecasts handle market maturity in their forecasts and to advise on how the Department's previous methods might be improved. That advice took some account also of market liberalisation.

Market liberalisation has in previous forecasts not been explicitly differentiated from market maturity. The paper explains how it is now handled, alongside market maturity, by changes to the interpretation of past data and by adjusting future elasticity assumptions, partly in the light of academic evidence.

All of these recommendations and developments, and the Department's proposed new handling of market maturity and market liberalisation, were discussed closely in the Department's aviation Technical Working Group, which included external experts from the Civil Aviation Authority and elsewhere.

3. The analysis

The paper rightly accepts that the previous method of adjusting for market maturity, by means of a set of power law equations, could and should be improved. That method did reduce future passenger forecasts over time, but had rather little theoretical basis. The Department also accepts the two main general recommendations of the academic consultants, that it is better to apply direct adjustments to the income elasticities estimated for each market and also that it is better to reflect the uncertainties by presenting for each market the effects of a range of alternative adjustments.

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[1] The others cover papers on the Passenger Allocation Model, on the econometric estimation of price and income elasticities and on a draft aviation section for the Department's web based Transport Appraisal Guidance.

The adjustment is applied by adopting, for each of three groups of markets, a year from which the income elasticity of demand is assumed to start falling towards a chosen terminal value over a subsequent period of generally 70 years. High, central and low growth scenarios are defined by the terminal value of the income elasticity. The basis of these numerical judgments is no more than informed judgement. They have however been extensively discussed by a reasonably wide range of experts. There is no clear reason to suppose that they are biased by overlooking or misinterpreting any of the limited available data.

A point of concern identified in the paper is the fact that the Unrestricted Error Correction Model (UECM) form of the equations, used for the estimation of elasticities from historical data, has been found to be incompatible with the imposition of declining elasticities in future years. The estimated UECM equations have therefore been used to derive another form into which declining elasticities over time can be imposed. But intuitively this does not look serious for future projections, as the UECM form is chosen, and retained, to handle the non-stationary historical time series.

A commendable final exercise in the paper is the "sense checking" of the forecast scenarios against the implied numbers of aviation trips per year per UK resident. The figures so derived look plausible.

The final paragraph of the paper's main text, on "potential further work" comments on a Departmental "expectation that the impact of maturity will become clearer, particularly in the domestic markets, over the next few years" and recommends that "the evidence on this is reviewed within the next three years". It explains that the Department "will also attempt to fit a range of functional forms to the data, … ideally [finding] a single model form … to produce forecasts over the full forecast period", before and after the time from which future declining elasticities are imposed.

These are worthy intentions, but it may be optimistic to expect the impact of long term maturity to be come materially clearer in any market within a few years. Thinking about future social, technological, or political changes that may markedly affect future air passenger traffic might merit at least as high a higher priority as re-examining functional forms.

4. Conclusion

This Department for Transport paper records, and presents clearly, a significant advance from previous aviation passenger forecasts in the handling of market maturity and market liberalisation. These are only two of the drivers or potential drivers of demand that that can be expected to be materially different in future decades, but they are two about which informed, quantitative judgment can be made.

The Department's approach to this development has been impartial and has made good use of internal and external expertise.

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