

## **Econometric Analysis to Develop Evidence on International Business Impacts**

**PWC Report to Airports Commission 25/11/13**

**Commentary by Peter Mackie, David Starkie and Dan Graham**

1. This work has gone through several iterations and the authors have separately commented on a previous version. There has been limited time and availability in which to draw this note together and so it is at the level of an overview rather than a detailed review. The separate comments of the three authors on the previous version are available to the Airports Commission.
2. PWC has been faced with a difficult problem. The subject addressed in this report is actually very difficult to tackle empirically. The links between transport interventions and the wider economy are difficult to identify due to the prevalence of confounding effects and the fact that the relationships of interest tend to be fundamentally bi-directional. So any serious econometric study has to address these two problems of confounding and reverse causality.
3. Overall the authors have responded to these problems in an appropriate way by adopting various instrumental variable (IV) panel approaches. The work represents a good starting point for analysis of a complex set of relationships. However, as the authors acknowledge, their different approaches produce conflicting evidence both about the sources of endogeneity and about the factors driving the economic effects of interest. Therefore we think the results have to be interpreted with caution and 'literal' interpretation of the magnitude of estimates should be eschewed. Instead, the results should be considered qualitatively as indications from emerging research and as a useful starting point which might be developed further. Indeed we believe this is consistent with the Conclusion of the PWC report (page 58).
4. Our view is that PWC's approach tends to be rather data driven. Rather than starting from a specified theory from which is developed hypotheses for testing, it tends to be driven by what the data says. We have reservations about the consultants' choice of some of the explanatory variables, whether they are meaningful and associated measurement difficulties. Preference for model A over model B tends to be driven by statistical performance rather than what might be expected from principle.
5. We note that in this type of work there can be issues at the join between estimation of elasticities or responsiveness properties and policy analysis. Even if the estimation work is developed further, there will still be non-trivial questions surrounding how a particular 'aviation intervention' such as more capacity in the London airport system is converted into additional international connectivity. Then there are further issues about what type of macroeconomic model is used to generate the predicted final UK economy impacts. These are outside PWC's brief but very important for the downstream policy work.

6. We now draw attention to some specific points.
7. ***Does connectivity drive trade and tourism or the reverse?*** At the heart of the modelling approach is the hypothesis that connectivity is a driver of trade and tourism. However in transport work in general the proposition is that demand drives supply with a feedback loop from frequency and other aspects of service quality to demand. We would like to see model runs with connectivity as the dependent variable to enable comparisons between the results and the current PWC approach.

***Seat capacity as a measure of connectivity*** : connectivity is really another word for accessibility and the standard measure of accessibility is generalised cost. Measuring changes in generalised cost is difficult, but the issue is--- how good is seat capacity as a proxy measure of accessibility? Suppose trends in seat capacity over the period of the model have been happening because of changes in real fares, changes in the availability of regional destinations etc, could the coefficient on SCAP be open to misinterpretation when applied to a pure supply increase? The other issue here is whether the consultants by choosing what they believe is a superior measure, namely seats rather than flight frequency, have foregone the opportunity of using a longer time series data.

8. ***Seat capacity definition*** : the process of aggregation using a weighting procedure to get the IATA connectivity index is described on page 10. But we are unclear when using this whether the connectivity change value of 1m extra seats at a hub UK airport will be any different from 1m extra seats spread around ten regional airports, some of which might be competing with the hub. Also, and very important, we are unclear why direct flight seat capacity has been used as the indicator when for some origin/destination pairs (eg UK to Far East and Australasia) the market share taken by indirect routeings (via the Gulf) has changed appreciably over the last decade. From an economic point of view, if indirect connectivity is a close substitute for direct connectivity, there is a risk that ignoring the cross-elasticities will lead in any modelling exercise to exaggerate effects for the direct effects. From a policy point of view if indirect connectivity is a partial substitute for direct connectivity (which the consultants comments on UK-India traffic indicate), this is of interest.
9. ***Data problems*** : a basic problem is the limited period from which the data is drawn at the most spanning ten years, nearly half of which time the UK and world economy was in deep recession. Although the data was pooled incorporating a large number of country observations, this does not offset the limited timespan and economic shock effect which will have had a particular bearing on tourism and trade. We have not considered in depth the final results but in the penultimate version :
- ***The FDI and outbound tourism*** results were quite problematic. Outbound tourism was modelled using inadequate data spanning only five recession years. Data problems bedevilled the FDI analysis as PWC recognise.
  - ***Trade*** analyses fared little better. In only one of the four analyses was UK GDP significant at the 10% level (exported services) and the exchange rate effect was not significantly different from zero.

- ***Inbound tourism*** on the other hand appeared to have produced reasonable results although even here the instability of the coefficients between model runs was noted.

10. Overall, in considering how to take this work forward, data quality is probably the most serious issue which will have to be confronted.

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