

# A Note from Expert Advisors, Prof. Peter Mackie and Mr Brian Pearce, on key issues considering the Airports Commission Economic Case

## May 2015

This is a note which attempts to provide our view of some of the key issues in considering the Economic Case. There is a great deal of material and we were asked by the Secretariat to draw out what we think are some salient points. The note is prepared independently of the Secretariat but has been checked by them for factual accuracy.

- Building the Economic Case is conceptually demanding and has not proved to be straightforward. This is in some respects a unique or at least very unusual appraisal.
- This is mainly a scheme which will be funded privately by air travellers rather than publicly by taxpayers. The conventional transport appraisal methodologies have largely been designed to inform public investment decisions. In contrast the Commissioners are to a great extent trying to arrive at a Planning recommendation albeit with a possible public funding component.
- The economic behaviour of various actors in a variegated system - airports, airlines, air travellers - is essential to the outcome but difficult to model with confidence. Price formation, and the fact that there is heavy price discrimination and yield management, is particularly difficult to represent in appraisal.
- The usual rubric that a UK plc appraisal is required is difficult to implement in the context of an internationally owned industry operating from many bases around the world and carrying a big mixture of passengers ranging from purely domestic right through to international travellers using the UK as an interchange point.
- The treatment of the CCC's planning assumption for carbon emission from aviation in the modelling and appraisal is inherently problematic.

Therefore the appraisal has been challenging and we would support the decision to adopt more than one approach, to pay attention to Government guidelines but not to be ruled by the rulebook.

## Commentary on the overall approach

There are four essential building blocks in the economic case:

- The supply side - the specification and costs of the various project options. We have nothing to say about this;
- The demand model - the traffic forecasts, airline competitive response, and the allocation of traffic between airports under a credible range of scenarios;
- The direct benefits and costs to the air transport system, operators, government and society at large; and
- The wider economy impacts which are approached alternatively by considering the additional wider impacts to the direct benefits (a la WebTAG) in the Wider Economic Impacts (partial equilibrium) work (Airport Commission's new work *Economy: Wider Economic Impact Assessment*) and by the GDP/GVA Computable General Equilibrium approach (the PWC Report titled *Strategic Fit: GDP/GVA impacts*).

The demand model has used the available Department for Transport methods both for generating the aggregate forecasts and for allocating the traffic between airports subject to capacity constraints. The Commission has created five scenarios which we think cover the range of competitive outcomes quite well : we would interpret two of them as being to varying degrees optimistic, two to varying degrees pessimistic, and one (Assessment of Need) to be a case based on continuation of historic trends. The issues which we think need to be borne in mind include:

- The credibility or otherwise of the Treasury economic growth forecast of 2.75% per annum over the life of the scheme as a central forecast. We note that the OECD in their latest Economic Outlook projected the growth of UK potential GDP between 2014 and 2060 at no more than 2% pa.
- The assumption of a constant elasticity demand form at all price levels (as opposed to a functional form where elasticities increase as prices increase). This reduces the responsiveness of air traffic to real fare changes driven by resource scarcity or carbon pricing and we believe is a partial explanation for the comparative inelasticity of the total market.
- The absence of any kind of demand capping. This means that in the latter half of the appraisal period, capacity is extremely constrained relative to demand, with no further capacity assumed to be brought on stream within the appraisal period. In road and rail appraisal, for example HS2, capping would be used to prevent excessive volume/capacity ratios from influencing the results too much.

The combination of these points leads us to think that it is prudent to focus on the less optimistic end of the range and we have focussed on the Assessment of Need scenario as a credible base for the appraisal.

A great deal of work has gone into the estimation of the direct benefits to the air transport system and travellers. This is the bedrock on which the work on the wider impacts on the economy and society rests. In our view, more confidence can be attached to the magnitude of the impacts in the transport market than the indirect impacts on the wider economy. The purpose is not to review the

work but to draw attention to some features of the work which come under the heading of 'issues to consider':

- A particular feature of this market, rare or unique in the context of transport appraisal, is the existence of a quasi-market for slots in a capacity constrained market. A basic assumption in the appraisal is that this market continues; indeed, in the reference case, the value of slots at constrained airports such as Heathrow and in due course Gatwick rises steeply so that demand at those airports is constrained to capacity by a combination of physical demand management and scarcity pricing. If capacity is increased, then unlike in say road appraisal, the scarcity rents to producers (airlines) are reduced and are transferred to airline passengers in the form of lower ticket prices. In the CBA, the largest feature is this offsetting movement between producers and consumers. In addition, there are benefits in the form of being able to choose a more convenient airport, higher frequency at that airport, improved range of destinations and reduced congestion delay. The issue in the appraisal is whether the balance between the transfer component between producers and consumers and the real benefits of improved service is correct. Our view is that the assumptions concerning the working of the market for slots and the transfer of scarcity rents between producers and consumers produce CBA results which are a little conservative. It is vital to remember that the do-minimum reference case is a journey into the unknown and it is inherently more difficult to predict the behaviour of the actors in highly constrained conditions than in what, over the appraisal period, is broadly a facilitation strategy designed to accommodate demand growth.
- For various reasons which could be rehearsed in more detail, we think the frequency and delay benefits in the appraisal are more modest than we would have expected. We think the opportunity to operate heavily congested facilities with a higher resilience margin is possibly not fully reflected in the benefit calculations.
- As mentioned above, there have been difficulties in representing a carbon capped scenario securely within the appraisal. Again there are various technical reasons for this which could be explained. Two points are worth making. First, the carbon traded CBA results are technically preferable because the supply and demand for carbon are balanced at an equilibrium market price. Secondly, because of the interaction between the carbon price and the scarcity value of slots, it is not clear, at least within the relevant range, that the carbon capped scenario necessarily produces lower net benefits than the carbon traded scenario--- at least if any tax revenue is regarded as a benefit which we think is correct and consistent with Green Book principles.
- As against these points, there is one feature of the CBA which you should be aware of. The cost of the scheme needs to be recovered by HAL/GAL through the RAB formula and passed through to airlines and ultimately their customers. So the loop between a higher cost base for the airport industry and its funding predominantly through ticket prices should be closed. This has not happened in the appraisal; aero charges are not passed through to air travellers. One reason given for this is that airlines have many opportunities for price discrimination and that assuming, say, a £10 per head supplement is passed through in a single average charge would not be realistic. We appreciate that this has been reviewed by ITF/SEO but in our view, the assumption that the aero charges can be passed through with no effects on demand and net user benefits seems to us a very strong assumption.

### Wider economic impacts partial equilibrium work (*Economy: Wider Economic Impacts Assessment*)

We turn now to the Wider Impacts as estimated by considering the direct transport impacts as a base and then attempting to estimate the *additional* wider economy impacts using methodology which is broadly compatible with WebTAG guidance (this refers to the new Wider Economic Impacts partial equilibrium work undertaken by the Commission since Consultation *Economy: Wider Economic Impact Assessment*). There has been little time to consider these results in detail and to QA them.

There are two great strengths of this approach. The first is that it follows a logic and approach which is compliant with official guidance which gives it some degree of legitimacy. The second is that it produces results which are in the ballpark of our prior expectation. If we take as our base the direct transport benefits to travellers with a PV of around £40-50bn then on this basis the wider impacts add of the order of £10bn to that. Particularly given that a high proportion of the passenger benefits are associated with leisure travel and tourism (inbound and outbound) where the net effect on the economy is thought to be small, we find the relativity above to be plausible.

The methodology for estimating the agglomeration and tax wedge benefits is taken from official guidance. However the application in the context of airport capacity is rather different from the generality of applications. Regarding agglomeration, the approach taken seems to apply well to the local industries and supply chain which would be beneficially affected by the size of the airport and airline businesses they serve. **However we consider that the approach taken to measuring agglomeration benefits does not adequately cover very high value added international sectors where aviation may be a key input enabling clustering of enterprises and people in particular locations. This is a significant limitation of the method and therefore any judgement about the interrelationship between airport capacity and the economic performance of the City of London needs to be part of the Strategic Case.**

Subject to these comments, in coming to an overall view, we would advise placing significant weight on the direct transport impacts plus the additional wider impacts discussed above.

### GDP/GVA Spatial Computable General Equilibrium approach (*Strategic Fit: GDP/GVA impacts*)

The main limitation of the CBA plus wider impacts approach lies in its partial equilibrium nature. While this is acceptable and proportional for the general run of incremental projects, there must be a doubt about whether CBA + really captures the final impact on the UK economy. For example, this approach values travel time savings through an estimate of the value of time rather than tracing through the proximate benefits into changes in productivity and thence into changes in prices, output and wages. Again, the CBA+ approach tends to assume full employment and competitive markets as the base for the appraisal, making specific adjustments where necessary.

Both of these points are examples of a generic point that CBA + does not take into account general equilibrium effects. Yet an infrastructure project the size of those under consideration by the Airports Commission might well affect Britain's competitiveness in various sectors of the economy. In principle the use of a Computable General Equilibrium (CGE) model, particularly with spatial dimensions, could be a useful framework within which to measure these market interactions and assess the impacts on final prices and outputs, allowing the estimation of a general equilibrium measure of the change in economic welfare. Even this might, according to some commentators, underrate possible dynamic or step-change economic responses (see below). Therefore we were fully supportive of trying a different approach.

Decision-makers are also interested in the impact of additional airport capacity on economic variables such as GDP and jobs. This is particularly legitimate for a project which is not a classic publicly financed project where the Commission is placed in the position of making a planning recommendation. GDP and employment impacts cannot be directly compared against the costs of the project and are not the same as a measure of economic welfare as in the CBA plus approach. Nevertheless, many would argue they are a valid focus for policy maker attention and may form part of the evidence base on which decisions are made. But we stress that Economic Impact assessment (EIA) which estimates the impact on these variables, is taking a different view from the standard transport CBA+. The EIA results are complementary, not a substitute - and certainly not additive - to the welfare measure from the CBA. The work by PWC for the Commission is a form of Economic Impact Assessment.

The PWC work aims at estimating the impact of the airport expansion options on economic variables like GDP and jobs using a Computable General Equilibrium approach. This is similar to that used for policy analysis by HMRC and as an approach is the right one, being internally consistent and accounting for where resources are drawn from as well as the sectors they go to. However, our note of caution to the AC is that this is an early attempt to use a new tool for this purpose and a number of difficulties have been encountered including:

- It is inherently more difficult to model effects which are spatially differentiated both within the UK and across international boundaries than, say, changes in tax rates; and
- The evidence base required to provide the front end to drive the model has not been fully developed; a change in a rate of VAT is far easier to represent in a model than a change in accessibility caused by an increase in airport capacity.

We discuss these and other points in more depth below:

**Modelling of the Shock to the Economy** - The HMRC model used by PWC has been extensively used to assess impacts or shocks to the economy which are broadly uniform in nature. Macro changes in taxes, public spending etc are often studied within this framework and the shock of, say, a change in VAT rate is modelled through the effect of price changes on sectoral outputs. In this case, building an extra runway is not modelled directly through a price effect. It is modelled by predicting the effect of increased capacity on air travel and then using relationships between travel, trade and tourism to reverse engineer an equivalent increase in productivity. Given statistical difficulties of understanding the direction of causality running through these interconnected relationships, we think the estimation of this equivalence is both uncertain and crucial to the subsequent calculations. The most serious issue is not with the model itself but with how to estimate the shock which new runway

capacity will administer to the economy. Other CGE simulations of infrastructure spend (eg Melbourne E-W Link by SDG and others) do model the shock using estimates of time and cost savings for users as measures of accessibility change. This is conceptually preferable because it is changes in costs which drive changes in productivity. **We believe that the implied elasticity (or responsiveness) of productivity to seat capacity in the model may be high and that this may partially account for the high model impacts on GVA.**

**Multiple Stages in the Economic Process** - The way in which improved capacity in the London airport system passes through the rest of the economy to deliver changes in final output is obviously complex. Our assessment of the PWC approach is that there is a high degree of overlap between the direct and wider impacts. So for example a benefit accruing proximately to a business traveller going abroad to negotiate an export contract might also show up as a trade effect. **We think there is likely to be some double counting between the direct and wider impact channels in the PWC calculations.**

**Exaggeration by media** - The headline numbers quoted in newspapers (such as £200bn) rely on economic growth and other assumptions which are at the extreme end of the range. Qualifiers such as “up to” do not give a flavour of the likely median or mean outcome across the economic scenarios. As mentioned above, some of the scenarios themselves rely on combinations of economic assumptions which are themselves at the optimistic end of the spectrum.

**The Gross Value Added Metric** - It is important to note on page 58 of the PWC report their interpretation, namely that the GVA numbers, typically in the £100-200bn of present value range, are the combined product of the airport infrastructure plus the induced investment elsewhere in the economy, for example in the supply chain. PWC state : “ The GDP result could not be achieved by investment in airport capacity alone without this follow-on investment. If a comparison with ratios from other types of appraisal were to be attempted, this additional investment would need to be included in order for the comparison to be like for like.’ Whether or not the GVA/GDP estimates are accurate or not, an important point is that the ratio of PV of GDP to investment costs should not be compared with benefit-cost ratios. This is comparing apples with pears. GDP is not a good measure of welfare, as is widely documented. Moreover, since welfare gains such as time savings for passengers using new capacity for a leisure trip are not reflected in GDP, there are reasons for expecting GDP impacts to be lower than the welfare gains. We find it hard to explain why the PWC results show GDP impacts of more than twice the size of the direct welfare and wider economic benefit gains.

**Multiplier effects** - A key feature of PWC’s model is that of general imperfect markets and apparent underutilisation of resources, so that the project represents a net injection into the economy *relative to the reference case*. If resources are fully utilized, which is not an unusual assumption to make for a 45-year appraisal, then demand shocks will over the long term simply pull resources from other regions and/or drive wages and prices higher, leaving national GDP unchanged. The imperfect competition and underutilization assumptions produce multiplied effects of the initial injection in the final economy and the GVA measure treats the value of additional output as a 100% increase in value added to the economy, ignoring the non-money costs (such as leisure time forgone) of creating this additional output. Our view is that in the particular circumstances of this project, it would be preferable to assume that the London economy is fully employed with wages representing

the value of the marginal product of labour. A sensitivity test has been run on this under which the perfect competition assumption produces a *higher* GVA effect than imperfect competition. We have not fully understood the working of this but are concerned that the GVA measure may not be a suitable indicator of the Net Value Added.

## Conclusion

This is one of the most ambitious attempts to prepare a quantified Economic Impact Assessment. There are few comparators available. While the content of the model itself has been well-tested, the same cannot be said of the front end, where an increase in capacity is converted into an increase in trip-making, trade, tourism and finally productivity. Furthermore the interpretation of the result--- what exactly do they mean and is their basis transparent--- is an issue. Overall, therefore, we counsel caution in attaching significant weight either to the absolute or relative results of the GDP/GVA S-CGE approach (PwC report) within the Economic Case. We would accept that there is some useful indicative material for the Strategic Case but care is required in assessing its robustness and reliability.

5/5/2015