Concerns with the Airports Commission's economic appraisal

October 2015

1 Summary

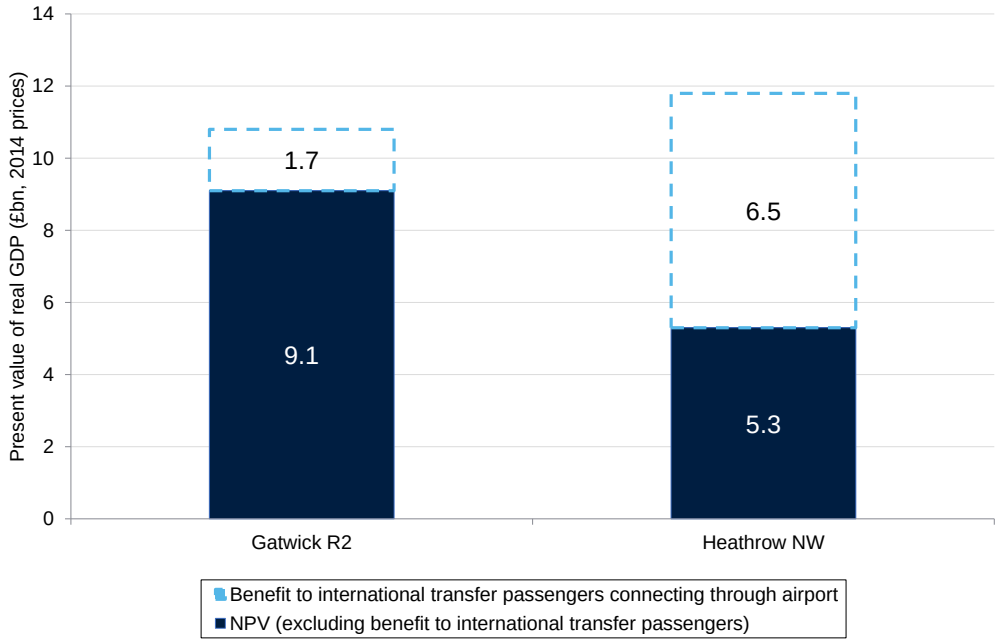
1.1 Oxera has reviewed a number of key aspects of the Airports Commission's economic appraisal, the outputs of which are presented in Table 7.1 of its Final Report.[1]

1.2 On the basis of the Commission's own analysis, the Gatwick second runway scheme (Gatwick R2) has a stronger economic case than that of the Commission's preferred scheme, a new Heathrow Northwest runway (Heathrow NW). The Commission appears to have reached a different view because it has not, in key respects, followed the relevant Department for Transport (DfT) and HM Treasury guidance.

1.3 In its presentation of the net present values (NPVs) of the two schemes, the Commission includes in its assessment the benefits to overseas passengers who are transferring through the UK. However, the DfT's appraisal guidance states that these benefits should be excluded as they do not accrue to UK citizens. Excluding these benefits from both schemes and recalculating NPVs shows that Gatwick's second runway significantly outperforms a new Heathrow Northwest runway, as illustrated in Figure 1.1 below.

[1] Airports Commission (2015), 'Airports Commission: Final Report', July, p. 147.

Figure 1.1 Net present value of benefits and costs(£bn, 2014 prices)



Note: Calculations based on assessment of need, carbon-traded scenario.
Source: Airports Commission; Oxera analysis.

1.4 The Commission also fails to present benefit–cost ratios (BCRs): using this measure of value for money (the DfT's preferred measure) Gatwick R2 has a BCR of 2.8, while Heathrow NW has a BCR of 1.7 using the Commission's figures. On these unadjusted metrics, Gatwick R2 would score 'high' on the DfT's value for money scale, while Heathrow NW would achieve a score of 'medium'. Excluding the international-to-international transfer passenger benefits would favour Gatwick more, with a ratio of 2.5, compared with Heathrow at 1.3. Using the DfT's value for money measure suggests that the Gatwick R2 would offer 'high' value for money, and Heathrow NW 'low' value for money.

1.5 The Commission's analysis also does not fully account for potential costs and/or lower benefits relating to risk and uncertainty surrounding its own conditions of expansion at Heathrow, such as a ban on night flights, a legally enforced noise envelope, and acceptable performance on air quality. These adversely affect the costs and benefits of the Heathrow scheme and need to be factored into the appraisal.

2 Oxera analysis

2.A Incorrect inclusion of benefits to international transfer passengers

2.1 The Commission presents the results of its economic case analysis using the NPV indicator as a measure of comparing costs and benefits. Under its carbon-traded scenario, it presents a higher NPV indicator for Heathrow NW than for Gatwick R2 (£11.8bn versus £10.8bn, respectively). In its calculation of the benefits from the scheme, the Commission includes benefits to international-to-international transfer passengers (i.e. overseas travellers who use the airport purely for connections).

2.2 However, the DfT's appraisal guidance (WebTAG) states that 'cost and time savings to these passengers are not counted as benefits to the UK'.[2] Deciding where to locate a runway in south-east England on the basis of benefits to people from outside the UK, who happen to use a UK airport to change planes, would be highly unusual. Indeed, as we show below, and in the Figure 1.1, removing the scheme costs and benefits relating to these passengers from the Airports Commission's estimates reverses the NPV result.

2.3 Oxera has undertaken analysis that removes the benefits relating to international-to-international passengers, consistent with the WebTAG guidance. An amended version of Table 7.1 in the Airports Commission's main report is shown in Table 2.1.[3]

Table 2.1 Net present value and social benefit calculation (£bn, 2014 prices) (amended Table 7.1 in Airport Commission's main report)

	Gatwick R2	Heathrow NW
Net social impact	16.8	28.0
Less: international-to-international transfer passenger benefits	-1.7	-6.5
Revised net social benefit	15.1	21.5
Scheme and surface access costs	-6.0	-16.1
NPV (excl. international-to-international passenger benefit)	**9.1**	**5.3**

Note: Calculations based on assessment of need carbon-traded scenario.
Source: Airports Commission; Oxera analysis.

2.4 The last row presented in Table 2.1 excludes the benefit that relates to international-to-international transfer passengers, as this benefit does not accrue to the UK. The figures include the capital costs associated with serving all passengers, including these overseas transfer passengers. Also included are the benefits to UK passengers from the increased connectivity from transfer services.

2.5 Once the benefits to overseas passengers connecting through the UK are excluded, Gatwick R2 has a higher NPV than Heathrow (£9.1bn compared with £5.3bn).

2.6 The Commission has suggested that it is appropriate to include the benefits felt by international-to-international transfer passengers on the basis that these

[2] Department for Transport (2014), 'TAG UNIT A5.2: Aviation Appraisal', January, para 3.2.6.

[3] Airports Commission (2015), 'Airports Commission: Final Report', July, Table 7.1.

passengers contribute to the cost of the schemes, and support the 'delivery of a dense route network for UK travellers'.[4] This latter point already being reflected in the traffic forecasts underpinning the Commission's numerical analysis. The former point is at odds with the Commission's suggestion that the costs of the scheme should be ignored as they are subject to private finance. Moreover, even if a contribution to costs were an appropriate calculation, it would be incorrect to use an estimate of benefits in lieu of an estimate of costs.

2.7 Oxera has undertaken additional analysis to show that, even if both airports were to avoid providing a service for additional international-to-international passengers, and were able to reduce costs accordingly, the NPV would still be higher for Gatwick. One way of undertaking this analysis is to use an estimate of the incremental scheme costs required to meet the needs of such international-to-international passengers. This largely requires an estimate of terminal construction cost, since all other works (runway, surface access, land purchase, landfill clearance, etc) are always required to meet the needs of origin-destination passengers. As terminal works account for just 20% of scheme construction costs, and international-to-international passengers account for 24% of traffic at Heathrow (on average, according to the Commission's traffic forecasts), the pro rata contribution would be just £0.6bn. This still leaves the NPV differential £3.2bn in favour of Gatwick, the NPV of which would be immaterially changed under this approach. Even a significantly higher cost attributed to transfer passengers would leave Gatwick considerably ahead.

2.8 An alternative approach would be to make an estimation of the contribution by international-to-international passengers to capital costs through airport charges. Again, surface access costs would be excluded since these are being funded by Government and/or users through road tolls. The residual capital cost might be expected to be paid for by all passengers. As international-to-international passengers account for approximately 24% of LHR traffic (on average, according to the Commission's traffic forecasts), and, as currently at Heathrow, a 25% discount is applied to all transfer passengers as compared to origin-destination passengers, the cost met by such passengers would therefore be £2.3bn. The applicable figure for Gatwick R2 is £0.1bn, resulting in an NPV of £7.6bn under the Heathrow NW scheme in comparison to £9.2bn under the Gatwick R2 scheme.

2.9 In other words, bringing the Airports Commission's analysis in line with DfT guidance shows that Gatwick R2 has a stronger economic case than the Heathrow alternative, under all measures. And even allowing for a contribution towards costs by international-to-international transfer passengers, this remains the case.

2.B Carbon-capped scenario: Commission finds Gatwick has stronger case

2.10 In its carbon-capped scenario, the Commission notes, following its own analysis, that Gatwick R2 has a higher NPV than either of the Heathrow schemes.[5]

2.11 The Commission then refers the reader to 'estimates for the foreign direct investment, tourism or broader benefits of associated additional surface access', which its analysis suggests are larger for Heathrow NW. [6] However, differences in these benefits are highly contentious, and the Commission's view appears to

[4] Airports Commission (2015), 'Airports Commission: Final Report', July, para 7.46.

[5] In which the Climate Change Committee's planning assumption—that emissions from the aviation sector should not exceed 2005 levels by 2050—is implemented as a constraint on traffic growth.

[6] Airports Commission (2015), 'Airports Commission: Final Report', July, para 7.53.

be based on the results of PwC's Spatial Computable General Equilibrium (S-CGE) modelling; however, its own reviewers (Mackie and Pearce) advise applying 'caution in attaching significant weight either to the absolute or relative results' of PwC's results. [7]

2.12 The Commission also states that the NPV results with carbon capped are 'outweighed by the stronger overall benefits delivered by the Heathrow scheme, particularly if it is privately financed'.[8] To the extent that this statement is driven by the PwC modelling referred to in the previous paragraph, the Commission's own advisers' doubts about the PwC analysis are once more highly relevant. If, however, the Commission is suggesting that costs can be ignored due to the use of private finance, we set out below that this is incorrect.

2.C The Commission fails to present benefit–cost ratios

2.13 According to WebTAG, appraisal results should be presented using BCRs,[9] a simple method of showing the benefits to the UK relative to the costs of the scheme. Effectively, the BCR is a simple return on investment metric. However, the Commission does not present the results of its economic case analysis using this metric, instead employing the NPV indicator only.

2.14 In its Final Report the Commission argues that BCRs are relevant only where there is a budget constraint, in the absence of which—including when the private sector is funding and/or financing the scheme—the NPV is to be preferred.[10] However, the Commission's own economic reasoning undermines this argument. The Commission itself accepts that the costs involved in expanding an airport might displace expenditure elsewhere in the economy, representing an effective budget constraint. [11] Indeed, its consultants, PwC, assume that these costs entirely displace such alternative expenditure.[12] In this sense, there is a macroeconomic budget constraint, so the BCR is clearly relevant.

2.15 As with public spending, the key issue therefore is to secure the benefits from airport expansion at the lowest cost to other economic activity. The BCR is therefore relevant, whether the scheme is developed using private or public finance. Moreover, in the private sector, such return on investment metrics are widely used in combination with NPVs. It has long been recognised that a project might deliver a higher NPV than another project or projects simply because it is a very big project requiring significant investment, rather than because it is a better, high rate of return project per se.

2.D The Gatwick scheme is preferred using the BCR indicator

2.16 Using the Commission's own analysis, from Table 7.1 in its final report, we find that Gatwick R2 has a BCR of 2.8, while Heathrow NW has a BCR of 1.7 (see Removing the benefit of expansion accruing to international transfer passengers, the Heathrow BCR now falls to 1.3, representing 'low' value for money according to the DfT's scale.

[7] Mackie, P. and Pearce, D. (2015), 'A note from expert advisors, Prof Peter Mackie and Mr Brian Pearce, on key issues considering the Airports Commission Economic Case', May.

[8] Airports Commission (2015), 'Airports Commission: Final Report', July, para 7.54.

[9] Department for Transport (2014), 'TAG UNIT A1.1: Cost-Benefit Analysis', January, para 2.1.1.

[10] Airports Commission (2015), 'Airports Commission: Final Report', July, para 7.47.

[11] Airports Commission (2015), 'Airports Commission: Final Report', July, para 7.46.

[12] PwC (2015), 'Airports Commission 1. Strategic Fit: GDP/GVA impacts', p. 72.

2.17 Table 2.2).[13] On these unadjusted metrics, Gatwick R2 would score 'high' on the DfT's value for money scale, while Heathrow NW would achieve a score of 'medium'.[14]

2.18 Removing the benefit of expansion accruing to international transfer passengers, the Heathrow BCR now falls to 1.3, representing 'low' value for money according to the DfT's scale.

Table 2.2 Net present value and social benefit calculation (£bn, 2014 prices) (amended Table 7.1 in Airport Commission's main report)

	Gatwick R2	Heathrow NW
Net social impact	16.8	28.0
Scheme and surface access cost (includes CAPEX and all SA costs)	-6.0	-16.1
NPV (net social benefits and PVC)	**10.8**	**11.8**
BCR	**2.8**	**1.7**
International-to-international passenger benefit	1.7	6.5
NPV (excl. International-to-international passenger benefit**)**	**9.1**	**5.3**
BCR (excl. International-to-international passenger benefit**)**	**2.5**	**1.3**

Note: Calculations based on assessment of need carbon-traded scenario.
Source: Airports Commission; Oxera analysis.

2.E No adjustments for conditions on Heathrow expansion

2.19 The Commission has failed to account for the uncertainty and accompanying costs around the conditions it recommends for expansion at Heathrow—it recommends 'a comprehensive package of accompanying measures which would make the airport's expansion more acceptable'.[15] These measures include a ban on night flights, a legally enforced noise envelope, and acceptable performance on air quality. Individually and in combination, the measures are likely to have significant impacts on the economics of the scheme. However, they are not accounted for in the Commission's economic case, nor in analysis of the distribution of scheme benefits and costs, despite the Commission judging them to be essential to implementation of the scheme.[16]

2.20 We consider each of these issues in turn.

- Table 14.1 in the Final Report shows an indicative change in the monetary effects of a reduction in sleep disturbance with the ban on night flights. However, the Commission does not calculate the impact on the benefits of Heathrow expansion of preventing long-haul flights from landing before 0600. These include flights from Hong Kong, Sydney, Singapore and Kuala Lumpur, which would then have to take up valuable slot capacity at a time of day

[13] The present value of Gatwick benefits is £16.8bn. Dividing this by the present value of costs (£6.0bn) gives a BCR of 2.8. While the present value of Heathrow NW benefits is higher, at £28.0bn, the costs are more than proportionately greater, at £16.1bn, causing the lower BCR.

[14] Department for Transport, 'Value for Money Assessments', available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/255126/value-for-money-external.pdf, accessed 12 October.

[15] Airports Commission (2015), 'Airports Commission: Final Report', July, p. 4.

[16] Good practice within modern scheme appraisals incorporates analysis of the distribution of benefits and costs. For example, recent assessments of the economic case for HS2 present 'the distribution of benefit cost ratios generated by considering the combined impact of the uncertainty around some of the key drivers of value for money'. See HS2 Ltd (2013), 'The Economic Case for HS2', p. 9.

when, for example, low-cost airlines prefer to depart—lessening the likelihood of significant use of Heathrow by this type of carrier.

Impact: likely to reduce welfare benefits of Heathrow scheme, and affects the connectivity case.

- The Commission recommends that 'noise performance targets (a noise envelope) should be agreed and Heathrow Airport Ltd must be legally bound to stay within these limits.' The Commission has not costed the necessary mitigation measures from Heathrow and its users; nor has it considered the implications for Heathrow's revenues from constraints on its operations arising from the envelope.

  Impact: likely to reduce welfare benefits of Heathrow scheme, and its financeability.

- On air quality, 'the Commission recommends that new runway capacity at Heathrow Airport should only be released when it is clear that air quality at sites around the airport will not delay compliance with EU limits. This should be a legally binding planning condition.'[17] Again, the assumption is that legally binding Heathrow would fully mitigate this risk, and, as above, the cost or potential delay to the scheme does not appear to be taken into account in the Commission's welfare analysis.

  Impact: likely to delay welfare benefits from being realised, and could be costly to airport owners and taxpayers.

2.21 The Commission's analysis has failed to take account of the operational limitations listed above. In addition, the Commission has not presented distributions of benefits and costs, which would account for the additional costs, and lower benefits that are likely to be faced in the presence of these risks. Furthermore, Sir Howard Davies has recently stated that, in view of the delivery risks and uncertainties associated with a scheme such as a third runway at Heathrow, the new capacity might not be available until 2030.[18] However, the Commission has not presented evidence regarding the impact on the economic case for the scheme of such a scenario. We conclude that between the impact of the conditions on Heathrow expansion recommended by the Commission and the possible delays to Heathrow NW opening, this is likely to reinforce further the finding above that **the economic case for Gatwick is stronger than for Heathrow NW**.

[17] Airports Commission (2015), 'Airports Commission: Final Report', paragraph 14.113.

[18] Davies, H. (2015), 'Letter to the Secretary of State for Transport', 7 September.