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ECONOMICS



# Impacts of closing Heathrow Airport and initial analysis of redevelopment impacts



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# Executive Summary

## Background

This report sets out the principal findings of modelling work undertaken by Oxford Economics to estimate the direct, indirect and induced impacts of closing Heathrow Airport in 2029.

It is part of a series of technical notes by Oxford Economics and Ramboll, prepared for Transport for London in support of Lot 4 of the Mayor’s Aviation Work Programme – the assessment of socio-economic effects. The Aviation Work Programme, in turn, has been conducted in order to develop a submission to the Airports Commission (or “Davies Commission”) which has been charged with examining the need for additional UK airport capacity.

The notes prepared by Oxford Economics have been designed to address specific questions and issues posed within paragraph 3.16 of Aviation Commission (2013) *Guidance Document 01*: While the notes prepared by Oxford Economics are separate, there is nonetheless some degree of interaction between the issues they examine. The issues and results from some of the key technical notes prepared by Oxford Economics are summarised in the table below:

**Table 1: Summary of key Oxford Economics Technical Notes**

Davies Commission Question/Issue	Results/Key messages
<p><i>Impacts on the UK economy through the provision of international connectivity - Alignment with the likely growth in demand for travel and ability to service that demand.</i></p>	<ul style="list-style-type: none"> <li>■ This note used an econometric model to examine connectivity benefits likely to be generated through building a new hub airport in the South East.</li> <li>■ The model suggests that a 10 per cent increase in business related connectivity increases economy-wide productivity – and hence GDP - by 0.5 per cent in the long-run.</li> <li>■ The long-term economic benefit of expanding airport capacity in the London area, consistent with the Department for Transport’s “unconstrained” capacity forecasts for 2050, is found to be equivalent to a GDP boost of £6.9 billion a year (at today’s prices).</li> </ul>
<p><i>Impacts on the local economy through the direct effects of airports - Impacts on the local and national economy through both direct and indirect effects</i></p>	<ul style="list-style-type: none"> <li>■ This note examined the employment and Gross Value Added (GVA) impacts of construction and operation of a new hub airport at Stansted, the Isle of Grain or the Outer Estuary.</li> <li>■ On a <i>gross national</i> basis, the total economic impacts of operating a new airport and associated ground transport at Stansted, the Isle of Grain or the Outer Estuary in 2050 vary from 377,000-392,000 jobs (depending on the option chosen) and £42bn of GVA</li> <li>■ On a <i>net local</i> basis, the operation of a new</li> </ul>

<p><i>on employment and skills.</i></p>	<p>hub airport at Stansted, the Isle of Grain or the Outer Estuary means employment in the local area is 123,000-134,000 higher and GVA is £16.2-£16.6 billion higher than would otherwise have been the case in 2050.</p>
<p><i>Impacts on the local economy through the direct effects of airports - Impacts on other airports.</i></p>	<ul style="list-style-type: none"> <li>■ This note modelled the economic impacts of the closure of Heathrow in the event of a new hub airport being developed.</li> <li>■ Excluding local redevelopment impacts, Heathrow local area employment (comprising direct, indirect <u>and</u> induced jobs) would be 77,000 lower in 2050 (compared to a business as usual baseline) if the airport were to close though unemployment is only modestly higher (3.5% rather than 3.0%).</li> <li>■ If the effects of one potential residential redevelopment scenario of the old Heathrow site are allowed for, in addition to the impacts of closure, then local area employment would be 33,500 lower compared to the baseline, while unemployment would stand at 3.6%.</li> <li>■ Local area employment falls should not be confused with increases in unemployment. A local area resident who is subsequently re-employed outside the local area (e.g. at the new hub or elsewhere) would be a “job loss” <i>from the point of view of the local area</i> but would not be unemployed.</li> <li>■ Regardless of closure, local population, employment and housing stock all increase between 2029 and 2050. This is even more true for the closure plus redevelopment scenario, where local population is 136,000 <i>higher</i> than the baseline population.</li> </ul>
<p><i>Consumer impacts - Impacts on the air freight industry, its customers and associated business sectors</i></p>	<ul style="list-style-type: none"> <li>• This note examined how increased airport capacity (or conversely the lack of additional new capacity) could affect airfreight and the economy.</li> <li>• Capacity constraints at Heathrow may have set in as early as 2005 and future cargo growth is threatened by the inability of London area airports to keep up with demand.</li> <li>• Modelling using the central case of a range of forecast scenarios suggests that by 2050, the value of air cargo lost to London due to capacity constraints would equate to £106 billion per annum. However, this is not equal to a net national GDP loss as much of this</li> </ul>

	<p>freight may be traded via other UK airports, or enter the UK indirectly.</p> <ul style="list-style-type: none"> <li>• An alternative, economic welfare based approach, suggests that by 2050 <i>net national</i> losses due to airfreight capacity constraints could equate to £3.9 billion per annum.</li> </ul>
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***This report models “closure and “closure plus redevelopment” scenarios for Heathrow***

This note focuses on the economic impact of the closure of Heathrow as a result of the opening of a new hub airport elsewhere within the London area. This work was undertaken in order to answer questions relating to the “impact on other airports” in response to one of the issues posed by the Aviation Commission’s (2013) *Guidance Document 01*

However, the closure of Heathrow would also involve the freeing up of a large area of space in West London. Given the pressing need for urban space in a city such as London, it is unlikely this land would simply remain vacant. Accordingly, this note models the impact of two scenarios on the Heathrow local area (defined as Hounslow, Hillingdon, Ealing, Slough and Spelthorne)<sup>1</sup>:

- The economic impact of closing Heathrow airport in the years 2029 -2050; and
- The economic impact of the closure above *plus* the subsequent redevelopment of the Heathrow airport site for residential and commercial purposes in the years 2030-2050.

The impact of these scenarios was compared to a “business as usual” baseline in which Heathrow remains open and is further described below<sup>2</sup>.

***Closure scenario***

Under this scenario, Heathrow is closed in 2029. Such a closure could have a variety of effects on local employment, as Heathrow workers and those in the associated supply chain may:

- leave the area and move to the new hub, or
- commute to the new hub, or
- find other new employment inside or outside the local area; or
- become unemployed; or
- leave the labour force

Our modelling indicates that, while local area employment would fall by 77,000 by 2050 under this scenario, relative to the baseline, the local unemployment rate would only be modestly higher by this year. Specifically, the local unemployment rate would be 3.5% in 2050 in the event of closure as opposed to 3.0% under the baseline.

The change in *employment in the local area* (which is measured on a workplace basis) should be distinguished from *the local unemployment rate* (which is measured on a residency basis). There may be fewer jobs in the local area in absolute terms, but much of this is simply because many residents may now work outside the local area, or have left the local area, not because they

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<sup>1</sup> The first of these scenarios also examines gross national impacts.

<sup>2</sup> All figures discussed in this Executive Summary are net impacts – i.e. they take into account, the fact that some workers would find alternative employment upon closure.

necessarily become unemployed. In particular, a significant number of people in specialist aviation-related roles are likely to find work at the new hub.

At the same time, as indicated in Table 2, local population, and employment growth continues in spite of closure. In particular, over the period 2029 to 2050, local population increases from 1.3 million to 1.4 million (growth of 12.5%) while local employment increases by 5.9% from 632,000 to 670,000. Further, as indicated in the main text, local area productivity levels fall only slightly (by 3 per cent) with the shift in employment patterns, while the transportation and storage sector continues to be a major local employer (accounting for 62,000 jobs in 2050, or 9 per cent of total employment).

**Table 2: Heathrow closure scenario - Key local area indicators – 2012-2050**

Scenario: Heathrow closes in 2029	2012	2029	2030	2035	2040	2045	2050
Population (000's)	1,121	1,282	1,291	1,332	1,372	1,405	1,443
Working age population (000's)	738	839	843	869	923	946	966
Migration (000's)	2	-13	-4	-4	-4	-6	-5
Employees (000's)	560	563	565	576	587	592	598
Self employment (000's)	68	69	69	70	71	71	72
Total employment (000's)	630	632	634	646	657	664	670
People based employment (000's)	562	537	538	547	554	557	562
Unemployment (000's)	24	28	28	30	33	33	34
Unemployment rate (% of working age)	3.2%	3.3%	3.3%	3.5%	3.6%	3.5%	3.5%
Participation rate (% of working age)	78.0%	71.6%	71.5%	71.3%	68.8%	68.0%	67.8%
Residence employment (000's)	552	573	575	589	602	610	621
Residence employment rate (% of working age)	74.8%	68.3%	68.2%	67.8%	65.2%	64.5%	64.3%
Net commuting (000's)	10	-35	-37	-42	-48	-53	-60
Housing stock (000's)	425	487	490	506	522	534	549
Households (000's)	417	493	497	519	542	562	584

### **Closure plus redevelopment**

As indicated, it is extremely unlikely that the Heathrow site would simply be left vacant after airport closure. The “closure plus redevelopment” scenario provides an initial high level analysis of the impacts of some site redevelopment for residential and commercial purposes, based on data provided by Transport for London (TfL). The proposed redevelopment relates to the creation of new housing and of four new town centres on 12 square kilometres of the old Heathrow site.

The results of this analysis for the year 2050 in terms of employment impacts are presented in Table 3 below.

**Table 3: Estimate of Heathrow closure impacts on local employment, allowing for redevelopment impacts**

	Jobs
<b>1</b> Oxford Economics total local area job and GVA reduction estimate (2050) (1)	77,000
<b>2</b> less redevelopment job and GVA creation estimate (2050) (2)	43,500
<i>-of which</i>	
<i>Associated residential employment</i>	36,000
<i>Four centres employment</i>	5,500
<i>Residential construction employment</i>	1,900
<i>Four centres construction employment</i>	100
<b>3</b> Job and GVA reduction in local area allowing for redevelopment (3) = (1)-(2)	<b>33,500</b>

In other words, incorporating the specified redevelopment impacts into the analysis means that, relative to baseline growth, the reduction in local area employment in 2050 is 33,500 (as opposed to 77,000 with no redevelopment), while the unemployment rate is 3.6% (as compared to 3.5% in the baseline)<sup>3</sup>.

As would be expected, local growth in population and employment continues to an even greater extent than is the case under the closure scenario. Population increases by some 24.7% between 2029 and 2050 (from 1.3 to 1.6 million, meaning that the local population in 2050 is some 136,000 *higher* than under the baseline of Heathrow remaining open). Total local employment expands by 12.8% from 632,000 to 713,000.

**Table 4: Heathrow closure plus redevelopment scenario - Key local area indicators – 2012-2050**

Scenario: Heathrow closes in 2029 plus redevelopment 2030-2050	2012	2029	2030	2035	2040	2045	2050
Population (000's)	1,121	1,282	1,291	1,350	1,437	1,515	1,599
Working age population (000's)	738	839	843	881	966	1,021	1,071
Migration (000's)	2	-13	-4	5	5	4	4
Employees (000's)	560	563	566	583	604	620	637
Self employment (000's)	68	69	69	71	73	74	76
Total employment (000's)	630	632	635	653	677	695	713
People based employment (000's)	562	537	539	553	570	583	598
Unemployment (000's)	24	28	29	32	35	36	38
Unemployment rate (% of working age)	3.2%	3.3%	3.4%	3.6%	3.6%	3.6%	3.6%
Participation rate (% of working age)	78.0%	71.6%	73.1%	72.9%	70.3%	69.3%	69.0%
Residence employment (000's)	552	573	588	610	644	671	701
Residence employment rate (% of working age)	74.8%	68.3%	69.7%	69.3%	66.7%	65.7%	65.5%
Net commuting (000's)	10	-35	-49	-58	-74	-87	-103
Housing stock (000's)	425	487	490	514	550	582	617
Households (000's)	417	493	497	526	567	606	647

The results in Table 3 reflect only one “residency based” scenario. As the site could be used for a number of different purposes, it would be possible to develop other scenarios in the future with different employment and GVA impacts to those described above.

It should also be noted that this is a broad, high level comparison. Further work would be required to refine these impacts. TfL have also indicated that further redevelopment opportunities exist at the Heathrow site and that a further 600ha of surrounding land could support additional commercial and residential development. The redevelopment of this area could be expected to further reduce the loss of local jobs and GVA.

### **Comparison of scenarios**

It is also instructive to compare the scenarios described above, directly. As indicated, population in the local area is actually *substantially higher* under the “closure plus redevelopment” scenario than under the baseline scenario, while the effects of the pure closure scenario on population are relatively modest (a fall of 21,000 by 2050, relative to the baseline).

A comparison of population change in the local area between 2002 and 2050, under the various scenarios, is provided in Chart 1 below:

<sup>3</sup> The slightly higher unemployment rate is due to a small increase in the participation rate (more people looking for work).

**Chart 1: Population in the Heathrow local area 2002-50, baseline and scenario comparisons**

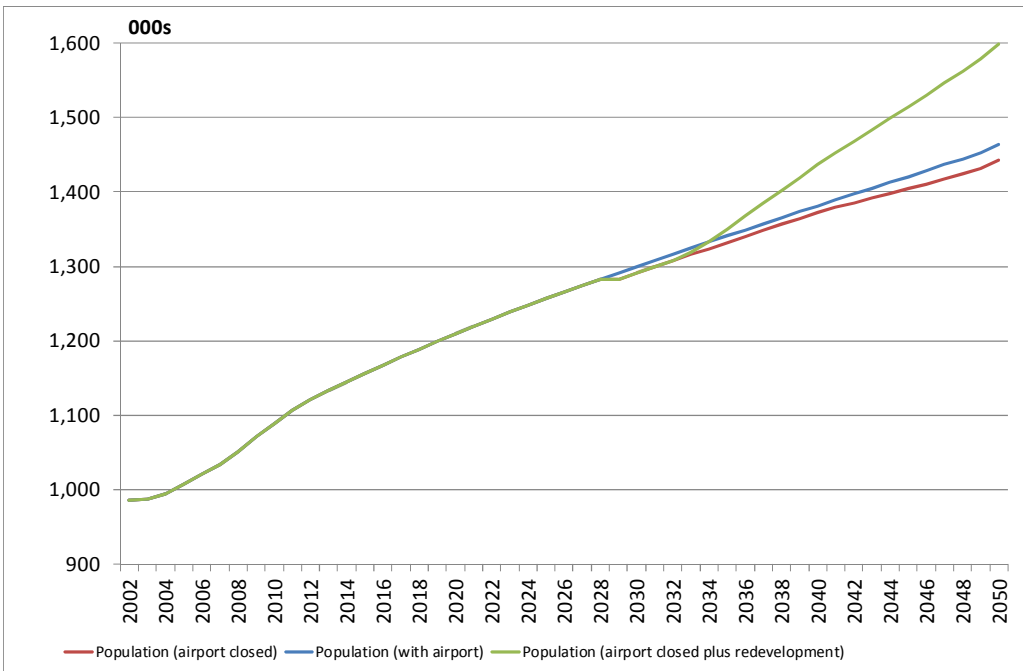


Table 5 below also provides a comparison of changes between 2029 and 2050 under both scenarios for selected key indicators. This indicates that local population and employment growth continues under both the closure and closure plus redevelopment scenarios. For example, population increases by 160,000 between 2029 and 2050 under the closure scenario and by 317,000 under the closure plus redevelopment scenario. Likewise, total employment, the housing stock and households all increase during these years under both scenarios. **In summary the effects on overall population and employment change in the local area to 2050 are positive under both scenarios.**

**Table 5: Key indicators in the Heathrow local area 2029-50 - scenario comparisons**

	Change 2029-2050: Closure scenario	Change 2029-2050 : Closure plus redevelopment scenario
Population (000's)	+160	+317
Total employment (000's)	+38	+81
Housing stock (000's)	+63	+131
Households (000's)	+91	+154



# 1 Introduction

Oxford Economics has been commissioned to model the national and local economic impact of closing Heathrow Airport. Section 2 of this paper describes our modelling approach, and the main assumptions and data sources used. Section 3 reports our findings for the UK and local level impacts of closing Heathrow.

Due to time and resource constraints it was not possible to include all possible impacts within the modelling. Some of these missing impacts are discussed in Section 4.

The focus of this paper is to provide a response to Davies Commission questions regarding impacts on other airports in the event of the opening of a new hub. However, Section 5 also goes beyond a simple closure scenario to provide an initial high level analysis of the impacts of some site redevelopment for residential and commercial purposes.

## 2 Approach and methodology

### 2.1 Overview of impacts modelled

A separate technical note describes the Input-Output (I-O) modelling used to estimate the local and national economic impacts of developing a new hub airport. In this section we describe how we have used similar techniques in reverse to model the impact of closing Heathrow. No assumption has been made within the modelling in this Section (or in Section 3 and 4) about future redevelopment of the Heathrow site, and the positive employment and GVA impacts that could generate. (However, Section 5 does provide a high level analysis of these issues). Other impacts excluded from the modelling are also discussed below.

Closing Heathrow would lead to reductions in employment and productive activity. The effects of this will flow through to other parts of the local and national economy as the businesses operating the airport reduce their requirements for goods and services from other industries in their supply chain. The reduction in employment will entail a reduction in earnings for those working at the airport and in its supply chain. Those affected can be expected to reduce their expenditure, creating a further round of impacts in those sectors where wages would have been spent. All of these impacts can be estimated through economic impact analysis.

Economic impact analysis focuses on the employment and gross value added (GVA) effects of a change in demand, such as the 'shock' created by closing Heathrow. In line with the description in the previous paragraph, it seeks to evaluate three aspects of such decreases in demand:

- **Direct impacts** quantify the effects on the businesses directly involved in a given project or industry. In this case they relate to the employment and GDP lost when firms cease to operate the airport.
- **Indirect effects** occur in the wider supply-chain as firms which were directly operating the airport reduce their purchases of goods and services from UK-based suppliers, in turn reducing output, profits and employment amongst those suppliers.
- **Induced effects** arise because the direct and indirect effects mean that wages paid to employees in affected firms are reduced, thereby reducing the money those employees have available for purchasing goods and services for their own consumption. This reduction in spending impacts on businesses (and so output and jobs) in the industries that supply these purchases.

Indirect and induced benefits are also termed "multiplier" effects. The sum of the direct, indirect and induced impacts equates to the total economic impact of the economic shock generated by closing Heathrow, as conventionally measured.

Within the time available, and the defined scope of the project, it has not been possible to incorporate three groups of impacts within the modelling:

- off-airport spending by passengers, such as on hotels, restaurants and car parking in the airport local area;
- off-airport activity within firms whose work is directly reliant on Heathrow, but which are not part of the Heathrow supply chain. This category could include, for example, a freight company that locates close to Heathrow because it is a customer of the airport (a freight company *supplying* services to the airport would be captured by the modelling of indirect impacts); and
- the potential impacts of economic activity attracted to the local area due its proximity to the airport, but which is not directly related to the airport or its supply chain. Typical examples of

such ‘catalytic’ impacts might include science parks or headquarters functions for international business services firms.

For these reasons, the modelling results outlined in this paper should be regarded as conservative. The ‘missing’ impacts identified above are discussed in more detail in a separate technical note.

A new airport may generate other impacts on the long-term productive potential of the local area, or indeed the UK. These effects are discussed in a separate technical note which considers the benefits of improving the UK’s connectivity.

A further consideration is the extent to which those who lose jobs when Heathrow closes might find alternative employment, either locally or in other parts of the country. Our treatment of such ‘displacement’ effects is discussed in Section 2.7.

## 2.2 Approach to modelling the direct operational impact of closing Heathrow

It is assumed that Heathrow closes in 2029 when the new hub airport opens. Services are effectively assumed to transfer to the new hub overnight (although in reality the transfer would be a much more complicated process spread over a longer period of time).

To understand the current employment situation at Heathrow we referred to the 2008/09 Heathrow employment survey<sup>4</sup>. We combined this information with ONS employment data<sup>5</sup> for the Heathrow ward to estimate a time series for employment at Heathrow. This enabled us to estimate a time series for jobs per million passengers per annum (MPPA) at Heathrow. The datasets revealed that between 1998 and 2011 Heathrow employment grew by 7.4 per cent. During the same period Heathrow passenger numbers grew by 14.4 per cent, i.e. each 1 per cent increase in passengers equated to a 0.52 per cent increase in employment on average. We used this relationship to estimate future employment levels at Heathrow if the airport remained open. Passenger number assumptions are shown in Table 2.2. Note that additional investment would be required at Heathrow in order to reach these future passenger numbers.

**Table 2.2: Heathrow passenger growth assumptions for the baseline scenario**

Year	2030	2035	2040	2045	2050
Million passengers per annum (MPPA)	82.0	84.8	87.5	90.3	93.0

*Source: Numbers provided by Atkins on 23/5/13 and consistent with DfT forecasts*

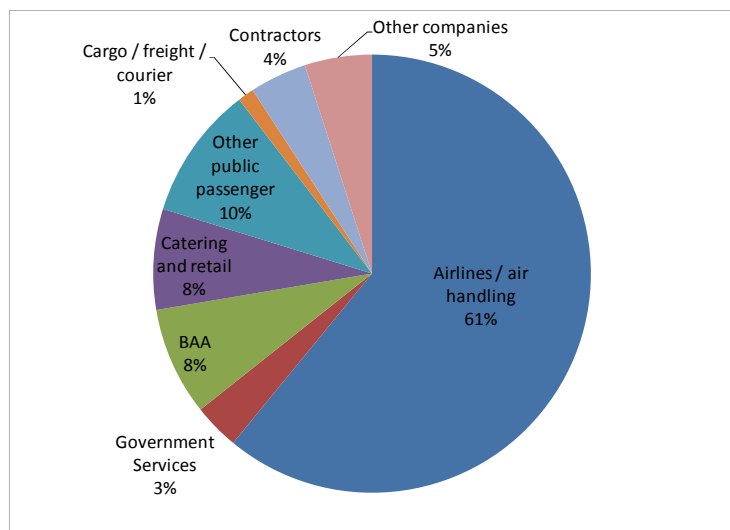
The breakdown of Heathrow employment across sectors is shown in Chart 2.2. To work with the data within the Oxford Economics forecasting models it is necessary to map the employment types in the Heathrow survey to industries in the Standard Industrial Classification. Based on Oxford Economics’ projections of industry productivity for Hillingdon (the London borough in which Heathrow is located), the GVA per worker for each job in each sector could then be estimated. Aggregating this up provides an estimate of the direct GVA currently generated by operational jobs.

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<sup>4</sup> Heathrow Airport Ltd (2010) Heathrow: On-airport Employment Survey, 2008/09, available at: <http://www.heathrowairport.com/static/Heathrow/Downloads/PDF/Employment-survey.pdf>

<sup>5</sup> From the Business Register Employment Survey and Annual Business Inquiry

**Chart 2.2: Heathrow employment, 2008-09**



Source: Heathrow: On-airport Employment Survey, 2008/09

### 2.3 Modelling the indirect impacts of ceasing operations at Heathrow

Input-Output (I-O) tables provide an account of who buys what from whom in the economy. They enable us to take the direct GVA generated by operation of an airport, and identify the supply chain associated with this output. These supply chain impacts on GVA are then converted into employment using Oxford Economics' data and forecasts of productivity in each sector.

To estimate the national level impacts, we can use the ONS I-O table directly. Local area multipliers were estimated from the UK I-O tables following a methodology developed by Flegg *et al.*<sup>6</sup> which adjusts the UK tables to reflect each local area's industrial structure and size. Local level multipliers will be much smaller than those for the UK. This is because a smaller local economy is less self-sufficient, so more of the supply chain effects 'leak out' of the local area to other parts of the UK or abroad.

Indirect labour productivity is assumed to be the same as that forecast for the relevant industry in the local area.

### 2.4 Modelling the induced impacts of ceasing operations at Heathrow

Reducing economic activity by closing Heathrow will inevitably reduce the incomes of those whose jobs are affected, either at the airport itself or in the supply chain. This loss in wages is estimated using the I-O tables, and adjusted to take into account the income tax and national insurance that would have been paid. We then estimate how the reduction in disposable income would have been spent, using the patterns of household consumption expenditure reported in the I-O tables.

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<sup>6</sup> Flegg A. T., Webber C. D. and Elliott M. V. (1995) "On the appropriate use of location quotients in generating regional input-output tables", *Reg. Studies* 29, 547-61.

## 2.5 Modelling local demographic impacts

In addition to our estimates of the GVA and employment impacts, we have undertaken an initial assessment of the demographic impacts in the local area surrounding Heathrow.

Using information on commuting flows from the 2001 Census, it is possible to estimate how much of the employment at Heathrow is taken up by residents of the local area, and how much is taken up by those commuting into the local area. In making these estimates we have taken into account that workers in different sectors may have different propensities to commute. For example, airline-related employment may be more likely to attract commuters, whilst low-paid jobs in retail and hospitality are more likely to be filled by local residents. The reduction in employment when Heathrow closes reduces employment rates in the local area, and some residents may migrate away from the area (or fewer residents might be attracted to migrate into the area). We have also incorporated this effect within our modelling.

## 2.6 Local definitions

To model the impact of closing Heathrow on its local area, it is necessary to define the “local area” to be included in the modelling. The Heathrow Employment Survey notes that 45.5 per cent of Heathrow staff live in the boroughs of Hounslow (where 10,755 Heathrow workers reside), Hillingdon (8,960), Ealing (5,760), Slough (4,092) and Spelthorne (3,916). Taking these five areas together, one in 14 of all people in employment work at Heathrow. The remaining 55.5 per cent of Heathrow workers are distributed much less densely across a large number of boroughs and districts and after the five boroughs identified, the next largest concentration of Heathrow workers is found in Windsor and Maidenhead, where 2,077 reside.

For the purposes of the modelling work we have defined the Heathrow local area to incorporate the boroughs of Hounslow, Hillingdon, Ealing, Slough and Spelthorne which, based on commuting patterns, are most reliant on Heathrow for employment and are therefore likely to be most affected by the closure of Heathrow.

## 2.7 Displacement: gross versus net impacts

Ceasing operations at Heathrow will have direct, indirect and induced impacts on GVA and employment for the local area, and the UK as a whole. However, these benefits are ‘demand-side’ impacts. In the long-run, UK employment and GVA are determined by supply-side factors such as the working age population and productivity. Under the modelling approach used for this paper, if the economy is operating to its full potential levels of employment and productivity, closing Heathrow will not reduce total employment and GVA at the UK level in the long run, since other sectors and regions would make use of the labour and capital released from Heathrow. It has been necessary to make this assumption given the time and resources available for the modelling tasks. Net national effects could be estimated using a Computable General Equilibrium (CGE) approach, and such an approach could be pursued as part of future work, time and resources permitting.

A second limitation of the I-O modelling approach is that it does not enable us to take into account the impact of a hub airport on the UK’s long-run productivity and attractiveness as a destination for skilled migrants and Foreign Direct Investment. That is, whilst we can model the direct, indirect and

induced impacts of *operating* the airport, the approach does not take into account the economic benefits provided by the *connectivity* a hub airport provides. Such effects are explored separately in the technical note dealing with connectivity<sup>7</sup>.

In contrast to the national level, the I-O modelling approach does allow for net changes in employment and output that persist in the long run *at the local level*. Whilst some of those who lose jobs when Heathrow closes would find alternative employment in the local area, others may not find jobs in the local area and would seek work in other areas. Those who are successful in their search commute out of the Heathrow local area to work each day, or migrate to another part of the UK.

We assume those undertaking lower-skill jobs at the airport, such as in retail, taxi driving and so on will be more likely to find alternative employment in the local area. Following a similar approach to the one outlined in the technical note dealing with the impacts of new hub development on the displacement of local workers when a new hub is built, we assume 30 per cent of such workers find alternative employment locally. This is based on the average displacement at the regional level reported in 2009 research by BIS<sup>8</sup>. Although this research was designed to apply to schemes creating a positive economic shock, we believe it also provides a reasonable estimate of a local economy's ability to 'absorb' the labour freed up by closing Heathrow. This is also consistent with the approach taken to displacement in our modelling of new hubs, described in the abovementioned technical note<sup>9</sup>.

Whilst many of those in low-skill jobs might remain in the local labour market, a significant proportion of people in specialist operational jobs requiring aviation-specific skills (e.g. air traffic controllers, airline jobs etc.) are likely to find alternative employment away from the local area once the airport closes (a significant proportion might work at the new hub airport, although this is not formally captured in the modelling of Heathrow closure). This is because the local area is less likely to support the types of jobs that these people are more suited to, while the higher skilled employees are also likely to be more mobile in terms of their ability and desire to find employment outside the Heathrow local area. We assume that only 15 per cent of this group of workers find alternative employment in the local area<sup>10</sup>.

The indirect and induced multiplier effects are based on the net direct impacts. The multiplier effects themselves are then reduced by 30 per cent across all sectors to account for displacement effects within the supply chain, consistent with our approach to lower-skill direct jobs, as described above.

## 2.8 Data sources

A number of data sources are identified throughout this report. All other data have been taken from Oxford Economics' UK local database which is, in turn, built with data from a number of ONS

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<sup>7</sup> Whilst we have modelled the impacts of closing Heathrow separately to the impacts of building and operating a new hub airport, it is extremely unlikely the two events would be independent in reality. So whilst closing Heathrow would reduce the UK's international connectivity, in reality this would only be likely to occur if a new hub airport had been built, which provided as least as much (and probably more) benefit to the UK at Heathrow.

<sup>8</sup> BIS (2009) Research to improve the assessment of additionality, available at: <http://www.bis.gov.uk/assets/biscore/economics-and-statistics/docs/09-1302-bis-occasional-paper-01>

<sup>9</sup> In the case of a new hub it is necessary to make allowance for the fact that a new airport will draw labour away from other industries.

<sup>10</sup> We apply this assumption to jobs in "airlines/air handling", "BAA" and "government services" as categorised by the Heathrow Employment Survey.

datasets, including mid-year population estimates, the Census, Regional Accounts, the Business Register Employment Survey, and the Annual Population Survey.

## 3 Impact on employment and output

### 3.1 National impacts

Firstly, as described in the previous section, even with the closure of Heathrow and no new hub airport developed we would not expect a net reduction in total UK employment and GVA in the long run because our modelling approach assumes the resources previously employed at the airport would be absorbed by other sectors and regions of the economy. Secondly, the overall national impacts have to be seen in the additional context of (a) the much higher national economic benefits that the new hub airport would offer compared to the current Heathrow and (b) that the closure of Heathrow will be followed by a carefully planned large scale redevelopment programme to meet the demands of an expanding world city.

It is nonetheless informative to consider the scale of resources freed up by closing Heathrow and Table 3.1 presents a summary of the gross national modelling results for this scenario. The data in the table represent the employment and GVA lost by closing the airport itself, without taking into account the likely movement of resources to other sectors and regions of the economy, the opening of a new hub at another site or the excluded upstream effects described in Section 2.1.

The table presents figures for selected years between 2029 and 2050, and cumulative figures to indicate the total impact over the entire 2029-2050 period. Key points from the table are:

- the gross direct, indirect and induced impacts of closing Heathrow would reduce UK GDP by £495bn (2013 prices) between 2029 and 2050. This is an average of £22.5bn per year; and
- the associated employment impact would be just over 5m lost job years (one job year is equivalent to one person being employed for one year). This is an average of 234,000 fewer jobs per year compared to the scenario where the airport remains open.



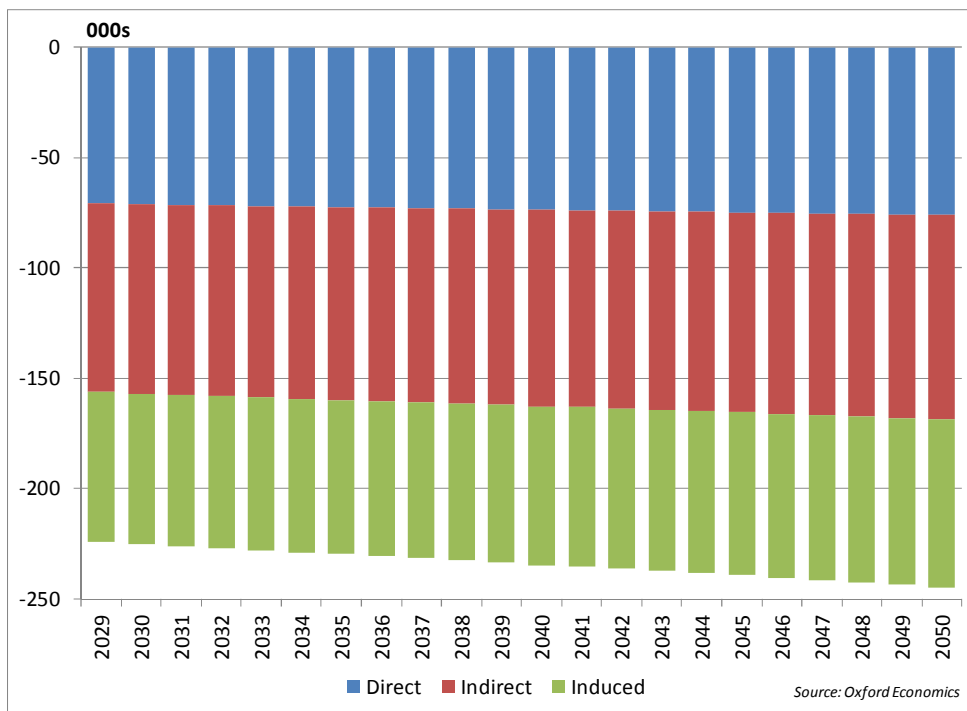
**Table 3.1: Summary of gross national impacts**

		Direct	Indirect	Induced	Total
Employment (000s)	2029	-71	-85	-68	-224
	2030	-71	-86	-68	-225
	2035	-72	-87	-70	-230
	2040	-74	-89	-72	-235
	2045	-75	-91	-74	-239
	2050	-76	-93	-76	-245
Cumulative employment impact 2029-2050 (000s of job years)		<b>-1,617</b>	<b>-1,956</b>	<b>-1,577</b>	<b>-5,150</b>
GVA (£m, 2013 prices)	2029	-6,752	-5,996	-4,680	-17,428
	2030	-6,921	-6,144	-4,796	-17,861
	2035	-7,789	-6,908	-5,395	-20,092
	2040	-8,750	-7,752	-6,056	-22,559
	2045	-9,818	-8,691	-6,791	-25,300
	2050	-10,975	-9,707	-7,588	-28,270
Cumulative GVA impact 2029-2050 (£m, 2013 prices, undiscounted)		<b>-192,095</b>	<b>-170,197</b>	<b>-132,952</b>	<b>-495,244</b>

Chart 3.1 only shows the gross negative employment effects on an annual basis. It highlights how the employment impact of closing Heathrow gradually rises from 221,000 in 2029 to 239,000 in 2050 in proportion to the passenger growth that would otherwise have occurred in the absence of the benefits from Heathrow redevelopment and higher national impacts of the new hub airport.

32 per cent of the gross change in national employment is the direct impact of closing the airport, and this proportion remains almost constant between 2029 and 2050. 39 per cent of the employment impact is indirect, reflecting reduced demand for the goods and services of firms in Heathrow's supply chain. The remaining 29 per cent of the impact is induced as direct and indirect employees reduce their spending.

**Chart 3.1: Gross national change in employment versus Oxford Economics baseline scenario**



### 3.2 Local employment and GVA impacts

Table 3.2.1, below, sets out the direct, indirect and induced impacts on employment and GVA during selected years and on a cumulative basis for the Heathrow local area. Consistent with the national figures above, these are *gross* estimates that do not take into account that some of those who cease working at Heathrow would move into other jobs in the local area.

The direct impacts are the same as reported in the national table since in both cases they represent the removal of on-airport activity at Heathrow. However, the indirect and induced impacts are smaller at the local level. This is because some of the indirect spending in the Heathrow supply chain 'leak outs' of the local area as operation of the airport draws on suppliers from elsewhere in the country. Key conclusions from Table 3.2.1 are:

- the gross direct, indirect and induced impacts of closing Heathrow would reduce local GVA by £242bn (2013 prices) between 2029 and 2050, an average of £11bn per year; and
- the associated employment impact would be 2.2m lost job years (one job year is equivalent to one person being employed for one year). This is an average of 99,000 fewer jobs per year in the Heathrow local area than there would otherwise have been.

**Table 3.2.1: Gross local employment and GVA impacts**

		Direct	Indirect	Induced	Total
Employment (000s)	2029	-71	-4	-20	-95
	2030	-71	-4	-20	-95
	2035	-72	-4	-20	-97
	2040	-74	-4	-21	-99
	2045	-75	-4	-22	-101
	2050	-76	-4	-22	-103
Cumulative employment impact 2029-2050 (000s of job years)		<b>-1,617</b>	<b>-92</b>	<b>-462</b>	<b>-2,171</b>
GVA (£m, 2013 prices)	2029	-6,752	-326	-1,421	-8,499
	2030	-6,921	-333	-1,457	-8,711
	2035	-7,789	-372	-1,639	-9,801
	2040	-8,750	-414	-1,842	-11,006
	2045	-9,818	-462	-2,066	-12,346
	2050	-10,975	-513	-2,310	-13,797
Cumulative GVA impact 2029-2050 (£m, 2013 prices, undiscounted)		<b>-192,095</b>	<b>-9,104</b>	<b>-40,424</b>	<b>-241,624</b>

Table 3.21 provides an indication of the jobs and GVA that would be lost by closing Heathrow, but not all of the jobs and GVA shown will represent a net loss to the local economy. Our preferred estimates of local impacts take into account that some of the resources employed at the airport would move into other parts of the local economy when the airport closed. These *net* results are presented in Table 3.2.2, below. Key points from this table are:

- in total, closure of the airport results in a net reduction of 1.6m job years in the Heathrow local area, after taking into account that some of those losing their job will take up work elsewhere. This means employment in the Heathrow local area would be between 71,000 and 77,000 lower each year than would otherwise have been the case; and
- closing Heathrow would lead to a £187bn reduction in GVA for the local area between 2029 and 2050. This is equivalent to an average of £8.5bn per year.

**Table 3.2.2: Net local employment and GVA impacts**

		Direct	Indirect	Induced	Total
Employment (000s)	2029	-57	-2	-12	-71
	2030	-58	-2	-12	-72
	2035	-59	-2	-12	-73
	2040	-60	-2	-12	-74
	2045	-61	-2	-13	-76
	2050	-62	-2	-13	-77
Cumulative employment impact 2029-2050 (000s of job years)		<b>-1,311</b>	<b>-51</b>	<b>-269</b>	<b>-1,631</b>
GVA (£m, 2013 prices)	2029	-5,578	-180	-826	-6,585
	2030	-5,717	-185	-847	-6,749
	2035	-6,435	-206	-953	-7,594
	2040	-7,230	-229	-1,071	-8,530
	2045	-8,111	-256	-1,201	-9,568
	2050	-9,068	-283	-1,343	-10,694
Cumulative GVA impact 2029-2050 (£m, 2013 prices, undiscounted)		<b>-158,703</b>	<b>-5,036</b>	<b>-23,504</b>	<b>-187,243</b>

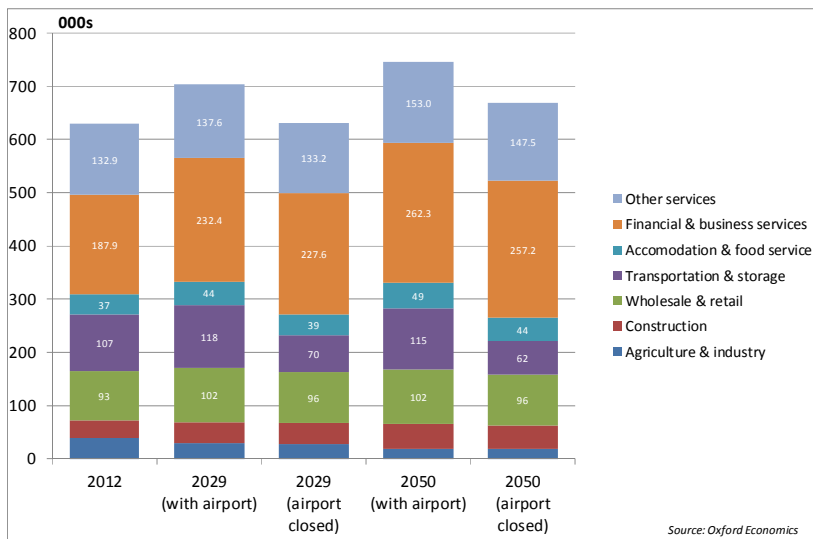
### 3.3 Impact on local employment structure

The tables above look at the overall impact in terms of local jobs and output, but closing Heathrow would also impact on the *structure* of the local economy. To consider this, Chart 3.3 looks at the current employment structure of the local area, and compares it in 2029 and 2050 in the case with and without the airport. These are net figures that reflect the combined impact of the direct, indirect and induced effects.

The white numbers on the chart denote the employment level within those sectors most affected by airport closure. Unsurprisingly, the largest change occurs in the transportation and storage sector. In 2012 this accounted for 107,000 jobs in the Heathrow local area (17 per cent of the total). Following airport closure, this falls to 70,000 in 2029 and 62,000 in 2050 (9 per cent of total employment). Employment in the wholesale and retail, and accommodation and food service sectors also falls. This partly reflects the employment in these sectors that is lost at the airport itself, and partly the induced impact of reduced household expenditure in the local area<sup>11</sup>.

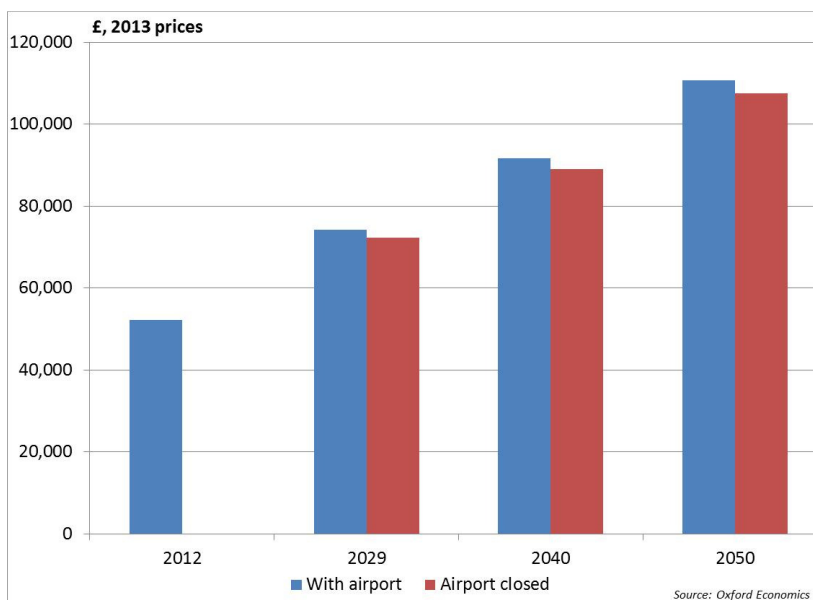
<sup>11</sup> As described in Section 2.1, it was not possible to incorporate spending in the local area by airport passengers. It is therefore possible that employment in the accommodation and food service, and wholesale and retail sectors, could fall by more than the modelling suggests.

**Chart 3.3.1: Heathrow local area employment structure**



Changes in employment structure caused by the closure of Heathrow would also have a slight influence on productivity levels (Chart 3.3.2). Our modelling suggests average output per worker would be around three per cent lower following closure of the airport. This reflects that, on average, the jobs lost would have had a slightly above-average level of productivity.

**Chart 3.3.2: Output per worker in the Heathrow Airport local area**



### 3.4 Local demographic impacts

Table 3.4 summarises the results of our modelling of local demographic and labour market impacts. The top block of data shows the Oxford Economics baseline forecast, which assumes Heathrow remains open. The middle block of data shows the situation in the Heathrow closure scenario. The bottom block of data shows

the impact of closing Heathrow, calculated as the difference between the baseline and Heathrow closure scenarios.

**Table 3.4: Demographic and labour market indicators**

<b>Baseline: Heathrow remains open</b>	<b>2012</b>	<b>2029</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>
Population (000's)	1,121	1,291	1,300	1,341	1,382	1,421	1,464
Working age population (000's)	738	847	851	877	931	961	985
Migration (000's)	2	-4	-4	-4	-4	-4	-4
Employees (000's)	560	626	627	640	652	659	666
Self employment (000's)	68	76	77	78	79	79	80
Total employment (000's)	630	703	705	719	732	739	747
People based employment (000's)	562	598	599	608	617	621	627
Unemployment (000's)	24	20	21	23	25	28	30
Unemployment rate (% of working age)	3.2%	2.4%	2.4%	2.6%	2.7%	2.9%	3.0%
Participation rate (% of working age)	78.0%	73.2%	73.1%	72.9%	70.3%	69.3%	69.0%
Residence employment (000's)	552	600	602	616	630	638	650
Residence employment rate (% of working age)	74.8%	70.8%	70.7%	70.3%	67.6%	66.4%	66.0%
Net commuting (000's)	10	-2	-3	-8	-13	-18	-23
Housing stock (000's)	425	490	494	510	525	541	557
Households (000's)	417	496	501	523	545	568	592

<b>Scenario: Heathrow closes in 2029</b>	<b>2012</b>	<b>2029</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>
Population (000's)	1,121	1,282	1,291	1,332	1,372	1,405	1,443
Working age population (000's)	738	839	843	869	923	946	966
Migration (000's)	2	-13	-4	-4	-4	-6	-5
Employees (000's)	560	563	565	576	587	592	598
Self employment (000's)	68	69	69	70	71	71	72
Total employment (000's)	630	632	634	646	657	664	670
People based employment (000's)	562	537	538	547	554	557	562
Unemployment (000's)	24	28	28	30	33	33	34
Unemployment rate (% of working age)	3.2%	3.3%	3.3%	3.5%	3.6%	3.5%	3.5%
Participation rate (% of working age)	78.0%	71.6%	71.5%	71.3%	68.8%	68.0%	67.8%
Residence employment (000's)	552	573	575	589	602	610	621
Residence employment rate (% of working age)	74.8%	68.3%	68.2%	67.8%	65.2%	64.5%	64.3%
Net commuting (000's)	10	-35	-37	-42	-48	-53	-60
Housing stock (000's)	425	487	490	506	522	534	549
Households (000's)	417	493	497	519	542	562	584

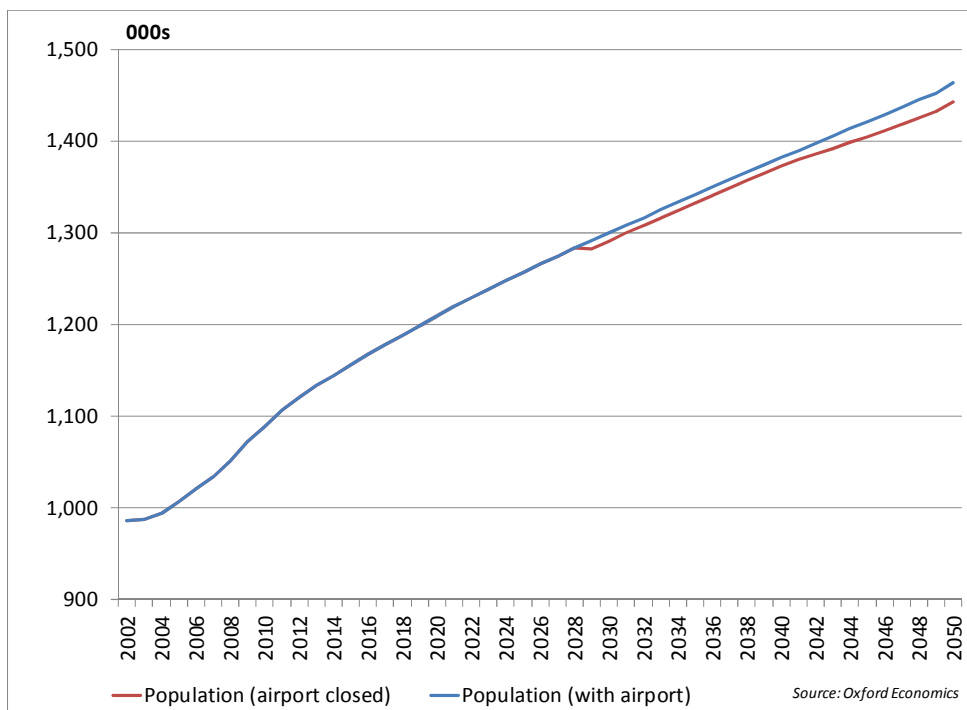
<b>Differences</b>	<b>2012</b>	<b>2029</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>
Population (000's)	0	-9	-9	-9	-9	-16	-21
Working age population (000's)	0	-8	-8	-8	-8	-15	-19
Migration (000's)	0	-9	0	0	0	-2	-1
Employees (000's)	0	-62	-62	-64	-65	-66	-69
Self employment (000's)	0	-8	-8	-8	-8	-8	-8
Total employment (000's)	0	-71	-72	-73	-74	-76	-77
People based employment (000's)	0	-61	-61	-62	-63	-63	-66
Unemployment (000's)	0	8	8	8	8	5	4
Unemployment rate (% of working age)	0.0%	0.9%	0.9%	0.9%	0.9%	0.6%	0.5%
Participation rate (% of working age)	0	0	0	0	0	0	0
Residence employment (000's)	0	-27	-27	-27	-28	-28	-29
Residence employment rate (% of working age)	0	0	0	0	0	0	0
Net commuting (000's)	0	-34	-34	-34	-35	-35	-37
Housing stock (000's)	0	-3	-3	-4	-4	-6	-8
Households (000's)	0	-3	-3	-4	-4	-7	-8

This modelling suggests:

- In the scenario where Heathrow closes, the Heathrow local area population would be 21,000 lower than in the baseline scenario by 2050. This equates to 8,000 fewer households. Nonetheless, even with closure of the airport the local population is expected to grow by 29 per cent between 2012 and 2050, and the number of households is expected to increase by 40 per cent. The population trend is illustrated in Chart 3.4.

- Closure of the airport in 2029 leads to a spike in net migration away from the Heathrow local area in that year. In subsequent years there is little difference between migration levels in the two scenarios.
- In 2012, 10,000 people are estimated to commute in to work in the Heathrow local area. In the baseline scenario, this is forecast to gradually shift to a net outflow of 23,000 by 2050. In the case where the airport closes, however, the net outflow is expected to increase much more sharply to 60,000. Given the strong ground transportation infrastructure around Heathrow, it should be possible for many of those who lose jobs at Heathrow to seek alternative employment elsewhere in London.
- In 2029 the unemployment rate would be 3.3 per cent if Heathrow closes, compared to 2.4 per cent in the baseline scenario – a difference of 0.9 percentage points. Over time this difference narrows to 0.5 percentage points by 2050.

**Chart 3.4: Population in the Heathrow local area, 2002-2050**



## 4 Other impacts of closure not captured in the modelling

This technical note has set out the main results from Oxford Economics' modelling of the direct, indirect and induced impacts of closing Heathrow Airport. Within the time available, and given the defined project scope, it has not been possible to model the impacts of reduced off-airport spending by passengers, or reduced off-airport activity amongst firms whose work is directly reliant on purchasing the services the airport provides. Such impacts would principally be reflected in the demand for services such as hotels, restaurants and car parking in the airport local area, or reduced activity amongst certain firms linked to the aviation sector such as express couriers.

To understand the potential order of magnitude of these kinds of impacts, we have referred to the 2011 report by Optimal Economics on Heathrow Related Employment<sup>12</sup>.

**Table 4.1: Estimated Direct Off-Airport Employment**

	Number	%	Captured in Oxford Economics I-O modelling?
Airlines and airline support services	900	11.5	Partially
Car parks	100	1.2	No (except those used by local residents)
Freight	4,400	57.0	Partially
Hotels	2,100	27.7	No (except those used by local residents)
Other	300	3.6	Unknown
<b>Total</b>	<b>7,700</b>	<b>100.0</b>	
Shops and restaurants used by airport users	Not reported		No

*Source: Based on Optimal Economics (2011) Heathrow Related Employment*

Of the categories identified in the Optimal Economics paper, car parks and hotels (to the extent they are used by passengers rather than local residents) are not captured within our modelling. It is unclear which activities fall within the 'other category', but there does not appear to be any provision within the analysis for other types of consumer spending by passengers in the local area (e.g. in restaurants, shops or on services other than car parks and hotels).

The Oxford Economics estimates of indirect impacts pick up freight activity purchased by the airport or airlines based at the airport, but does not include freight companies which simply choose to locate close to the airport for efficiency or convenience. For example, a courier company might wish to be close to the airport as a user of the airport's freight facilities, even if it does not sell its services to the airport or other firms based on the airport). There is no information available to enable us to isolate the proportion of the 4,400 off-airport freight not already captured within our modelling.

<sup>12</sup> Optimal Economics (2011) Heathrow Related Employment, available at:

<http://www.heathrowairport.com/static/Heathrow/Downloads/PDF/Heathrow-Related-Employment-Report.pdf>



Similarly, some proportion of the 900 airline and airline support services jobs may not be captured within our modelling if they do not form part of the airport supply chain.

Overall, some of the 7,700 off airport jobs estimated by Optimal Economics will already be included in our modelling results, and some of the off airport passenger spending we know to be excluded from our modelling may also be missing from the Optimal Economics numbers. On balance it would seem reasonable to regard the 7,700 figure as an upper estimate of direct off-airport employment in 2011.

Separately, it has also not been possible to model the impact of the Heathrow local area's attractiveness to investors in sectors unrelated to the airport, but which would benefit from proximity to an airport. Typical examples of such 'catalytic' impacts might include science parks or headquarters functions for international business services firms. Such impacts are explored in the context of a new hub airport in a separate technical note.

## 5 Site redevelopment impacts

### 5.1 Local impact of re-development of the Heathrow site

The I-O modelling in Sections 2-4 above has necessarily assumed the Heathrow site is not redeveloped. However, this simplifying assumption is arguably unrealistic, given the location of the site and its excellent surface transport links to Central London.

Potential redevelopment scenarios have been provided to Oxford Economics by Atkins and Transport for London (TfL). These scenarios which assume that residential redevelopment commences in 2033 and continues for up to 20 years are discussed below.

### 5.2 Impact of re-development of the Heathrow site – Atkins figures

Atkins have created an “indicative set of working estimates” to illustrate the potential scale of housing and employment that could be accommodated by redeveloping the 12 square km site<sup>13</sup> formerly occupied by Heathrow. These suggest the site could accommodate around 80,000 homes, serving a population of at least 184,000 by 2053. By Atkins’ estimates, there would also be employment space for 46,000 jobs. Atkins note, however, that the density of housing could be higher than their initial assessment suggests and so these estimates could be conservative.

The number of jobs suggested by Atkins is lower than the number our modelling suggests would be lost by closing Heathrow. It is unclear whether Atkins have made any assumptions about the extent to which jobs on the redeveloped site might offset employment growth in other parts of the local area. Assuming Atkins’ estimates do not account for such effects, Atkins’ 46,000 jobs could be compared to our gross direct local modelling results for closing Heathrow, which suggest a direct employment loss of 76,000 per year by 2050. (This ignores the fact that the Atkins estimates appear to relate to 2053 rather than 2050.) Doing so produces a net job loss within the local area of approximately 30,000, as indicated in Table 5.2 below

**Table 5.2: Comparison of Atkins and Oxford Economics (gross direct) jobs figures**

	Jobs
Oxford Economics local area job loss estimate (2050) (1)	76,000
less Atkins redevelopment job creation estimate (2053) (2)	46,000
Job losses in local area allowing for redevelopment (3) = (1)-(2)	30,000

As indicated this comparison ignores the apparent slight discrepancy in years between these two sets of jobs figures. Further, without additional information on the job types and sectors that make up the 46,000 figure it is not possible to compare the indirect and induced effects of redevelopment to the impacts of airport closure, although depending on the structure of supply chains and commuting patterns it is conceivable that the figure of 46,000 could already incorporate some element of indirect and induced employment impact. If that were the case, the difference between

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<sup>13</sup> Atkins (2013) A New Airport for London, The Strategic Planning Case

employment at the redeveloped site and the number of jobs lost by closing Heathrow could be even greater than the comparison in the previous paragraph suggests.

A further consideration is the timing of any redevelopment. It is unlikely any redevelopment could start until flights are fully transferred to the new hub. There would then follow a period of planning and construction that could last for many years before employment space is opened up (assuming residential construction would start in 2033 following a decommissioning phase). There could therefore be a significant gap between jobs ending as the airport closes, and new employment opportunities becoming available as the redeveloped space enters operation. It would not be the case that workers losing jobs at Heathrow could simply take up a new job on the redeveloped site. One possible exception is those with construction skills who are currently employed at Heathrow, who might be able to gain employment in any construction related to the redevelopment.

Further information provided by TfL in the context of slightly different model assumptions has helped to further clarify some of these issues and is discussed below.

### 5.3 Impact of re-development of the Heathrow site – TfL and Oxford Economics figures

Information on Heathrow site redevelopment has also been provided to Oxford Economics through TfL. This information would appear to be similar to the data used in the Atkins report above, however TfL has also provided additional information which helps to clarify the nature and timing of the proposed Heathrow site redevelopment. This has allowed Oxford Economics to undertake analysis which offers a greater degree of consistency with the results discussed in Sections 2-4 above. It also allows for some comparison with the results reported in those Sections.

The information provided by TfL relates to a development period over the years 2030 to 2053 (inclusive). The redevelopment scenario relates to the creation of new housing and the creation of four new town centres for commercial purposes. The information provided indicates that:

- The redevelopment consists of an area of 12 square kilometres on the old Heathrow site
- This area would be gradually redeveloped to accommodate 68,000 new residential units by 2050, rising to 80,000 units by 2053
- 156,400 people would be accommodated in these units by 2050 and 184,000 by 2053. This would provide a final population similar to Kensington and Chelsea.
- Based on GLA data suggesting that every 1,000 residents in a London ward supports 230 jobs in that ward<sup>14</sup>, the increased residential population would be associated with 35,972 jobs by 2050 and 42,320 jobs by 2053.
- Additional employment would also be provided through commercial activity at the four new town centres<sup>15</sup>. These town centres and their associated employment were assumed to

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<sup>14</sup> GLA Economics (2005) *More residents, more jobs ? The relationship between population, employment and accessibility in London*

<sup>15</sup> As the GLA figure cited above relates to total jobs within a ward associated with the increase in total population, some of these town centre jobs might arguably be captured within the jobs/population relationship specified by the GLA. However as the GLA figure relates to a broad relationship it is difficult to know to what extent this is the case. Nonetheless, the four town centres constitute a major new development (as opposed to incremental development of, for example, a few retail outlets, to support a growing population). This analysis therefore takes the view that these employment effects are broadly additive to

grow at the same rate as the residential construction. Based on a ratio of one job per 20 square metres of floorspace, 6,970 (gross) jobs were estimated by TfL as being created by 2050 with town centre employment, rising to 8,200 jobs by 2053.

TfL also provided data on the construction costs associated with the residential development.

Using the information above, Oxford Economics was able to develop some high level modelling assumptions for the proposed redevelopment. These assumptions included the following:

- 2050 was chosen as the year of analysis to assist with comparability to the impacts of Heathrow closure, noted above.
- The analysis was conducted on a total economic impact “net” jobs and GVA basis (i.e. allowing for both “multiplier” effects – the direct, indirect and induced impacts discussed above - and displacement effects within the local area).
- The TfL estimate of the number of jobs associated with increased residential population (35,972 jobs in 2050 or 36,000 rounded to the nearest hundred) was examined and adopted. Given that the GLA relationship relates to total effects across a local economy, it was considered to be analogous to total employment effects after allowing for multiplier effects and displacement impacts.
- TfL data on the number of jobs in the four town centres were adjusted to allow for both multiplier effects and displacement effects. Using the local area input-output model described in Sections 2-3, this produced a total local area figure of 5,500 jobs (rounded) in 2050.
- Residential and town centre construction-related jobs were also estimated on the same basis – i.e. allowance was made for both multiplier and displacement effects. Allowance was also made for changing productivity levels over time. The residential construction employment estimates used the TfL data on site preparation and construction expenditure as an input to our local area input-output model. This suggested residential construction would generate a total of roughly 1,900 local jobs in 2050. The same approach was also used to estimate employment associated with site preparation (which was assumed to last from 2030-2032.) As TfL did not provide estimates for employment generated by construction of the four town centres, this was estimated based on estimated centre size (205,000 square metres as per information provided by TfL) and construction costs per square metre for major UK shopping centres, as reported in Turner & Townsend (2012).<sup>16</sup> The derived construction cost was then used as an input to our local area input-output model. Analysis using these model inputs suggested town centre construction would support approximately 100 jobs across the local economy in 2050. Total residential and town centre construction effects in 2050 therefore supported some 2,000 jobs across the local economy.

Table 5.3.1 provides a breakdown of the estimated employment associated with the redevelopment between 2030 and 2050.

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those associated with the new residential population. More detailed analysis would be required to test the precise extent of this additionality.

<sup>16</sup> Turner & Townsend (2012) *International construction cost survey 2012*. This was reported as £2,281 per square metre in 2011. This value was adjusted to 2013 values via a CPI adjustment to derive a final figure of £2,405 per square metre.

**Table 5.3.1: Estimate of residential and town centre redevelopment – total employment impacts (000 of jobs)**

Year	Residential units (occupants)	Residential units (construction)	Four centres (construction)	Four centres (operation)	Total
2030	-	0.8	0.0	-	0.8
2031	-	1.5	0.1	-	1.6
2032	-	1.5	0.1	-	1.6
2033	0.8	0.9	0.0	0.1	1.9
2034	2.1	1.5	0.1	0.3	4.0
2035	4.2	2.4	0.1	0.7	7.3
2036	6.3	2.3	0.1	1.0	9.8
2037	8.5	2.3	0.1	1.3	12.2
2038	10.6	2.3	0.1	1.6	14.6
2039	12.7	2.2	0.1	2.0	17.0
2040	14.8	2.2	0.1	2.3	19.4
2041	16.9	2.1	0.1	2.6	21.8
2042	19.0	2.1	0.1	2.9	24.2
2043	21.2	2.1	0.1	3.3	26.6
2044	23.3	2.0	0.1	3.6	29.0
2045	25.4	2.0	0.1	3.9	31.4
2046	27.5	2.0	0.1	4.3	33.8
2047	29.6	1.9	0.1	4.6	36.3
2048	31.7	1.9	0.1	4.9	38.7
2049	33.9	1.9	0.1	5.2	41.1
2050	36.0	1.9	0.1	5.5	43.5

The additional GVA associated with the additional employment reported above was also calculated using our local area models.

These results can be broadly compared to the (negative) effects on local jobs and GVA of airport closure, as reported in Sections 2-4 above. Table 5.3.2 below provides the results of the local area modelling for jobs and GVA and makes this comparison<sup>17</sup>.

**Table 5.3.2: Estimate of Heathrow closure impacts allowing for redevelopment impacts**

	Jobs	GVA (£b)
Oxford Economics total local area job and GVA reduction estimate (2050) (1)	77,000	10.7
less redevelopment job and GVA creation estimate (2050) (2)	43,500	3.4
<i>-of which</i>		
<i>Associated residential employment</i>	36,000	
<i>Four centres employment</i>	5,500	
<i>Residential construction employment</i>	1,900	
<i>Four centres construction employment</i>	100	
Job and GVA reduction in local area allowing for redevelopment (3) = (1)-(2)	<b>33,500</b>	<b>7.3</b>

<sup>17</sup> These comparisons are made on a total net (i.e. after displacement) employment and GVA basis. So for example, the total net local loss in 2050 was some 77,000 jobs, and £10,694m in GVA in 2050 as reported in Table 3.2.2. This is in contrast to the estimates in Table 5.2 which are made by comparing the gross direct local employment figures reported in Table 3.2.1 with the Atkins results.

In other words, incorporating the specified redevelopment impacts into the analysis means that, relative to baseline growth, the reduction of local area jobs in 2050 is 33,500 (as opposed to 77,000 with no redevelopment) while the accompanying local area GVA reduction is now £7.3 billion (from £10.7 billion). It should be recalled that *underlying total* local area employment continues to grow after 2030 with (or even without) redevelopment. Further, a loss in local area jobs is not equivalent to increased unemployment, as many who lose their jobs could obtain new ones outside the local area.

It is also possible to consider these demographic trends in more detail, in a manner similar to the discussion in Section 3.4. Table 5.3.3 below makes these comparisons as per those in Table 3.4. However, in this case the comparison is between the baseline of Heathrow remaining open and a scenario of airport closure plus site redevelopment, as specified above.

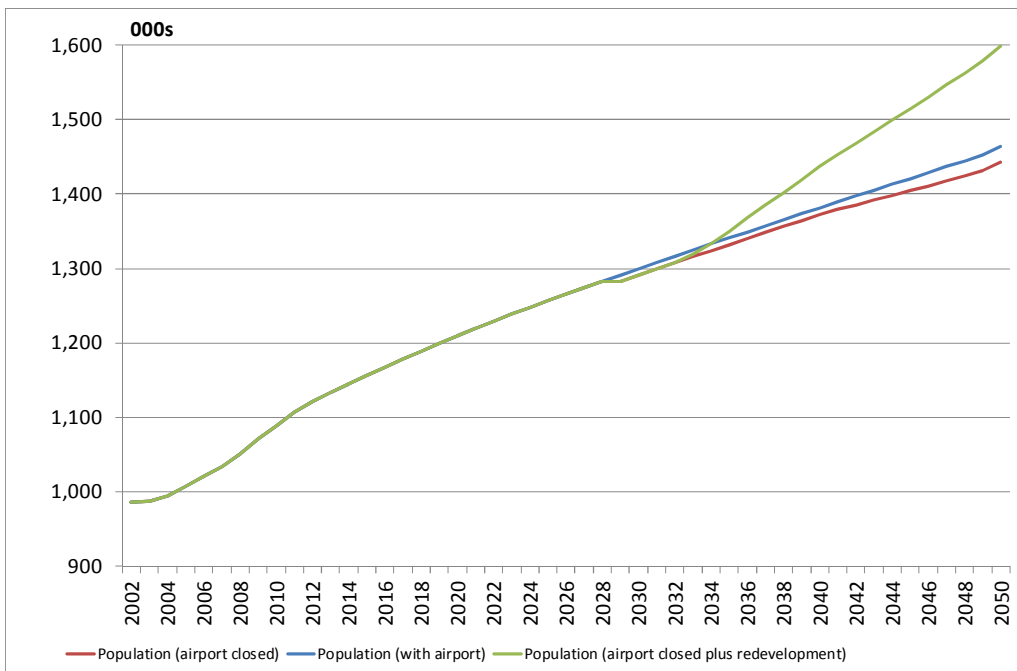
Given this the “closure plus redevelopment” modelling suggests that:

- If Heathrow closes but the specified redevelopment is pursued, the Heathrow local area population would be 134,000 higher than in the baseline scenario by 2050. This equates to 55,000 extra households. Chart 5.3 reflects these changes.
- Closure of the airport in 2029 leads to a spike in net migration away from the Heathrow local area in that year, as per the scenario described in Section 3.4. However, migration turns positive after 2030, as the new housing development takes shape, with approximately 9,000 new migrants per year from 2035 on.
- In 2012, 10,000 people are estimated to commute in to work in the Heathrow local area. In the baseline scenario, this is forecast to gradually shift to a net outflow of 23,000 by 2050. In the case where the airport closes and redevelopment occurs, however, there is a major increase in net outflow which rises to 103,000 by 2050. This would reflect the fact that some of the new population in the area would seek employment outside the local area. As per the discussion in Section 3.4, given the strong ground transportation infrastructure around Heathrow, it should also be possible for many of those who lose jobs at Heathrow to seek alternative employment elsewhere in London.
- By 2050 the unemployment rate would be 3.6 per cent if Heathrow closes plus redevelopment occurs, as compared to 3.0 per cent in the baseline scenario – a difference of 0.6 percentage points.
- The unemployment rate in 2050 under the closure plus redevelopment scenario is actually marginally higher than the rate under the simple closure scenario in 2050 (3.5 per cent). However note that the participation rate under the closure plus redevelopment scenario is higher (by 0.1 percentage point) than under the baseline scenario and notably higher than under the simple closure scenario (1.2 percentage points). In other words, while unemployment is technically higher under the redevelopment scenario, this is a result of the fact that more people are looking for work in the local area.

**Table 5.3.3: Demographic and labour market indicators – baseline vs. closure plus redevelopment**

<b>Baseline: Heathrow remains open</b>	<b>2012</b>	<b>2029</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>
Population (000's)	1,121	1,291	1,300	1,341	1,382	1,421	1,464
Working age population (000's)	738	847	851	877	931	961	985
Migration (000's)	2	-4	-4	-4	-4	-4	-4
Employees (000's)	560	626	627	640	652	659	666
Self employment (000's)	68	76	77	78	79	79	80
Total employment (000's)	630	703	705	719	732	739	747
People based employment (000's)	562	598	599	608	617	621	627
Unemployment (000's)	24	20	21	23	25	28	30
Unemployment rate (% of working age)	3.2%	2.4%	2.4%	2.6%	2.7%	2.9%	3.0%
Participation rate (% of working age)	78.0%	73.2%	73.1%	72.9%	70.3%	69.3%	69.0%
Residence employment (000's)	552	600	602	616	630	638	650
Residence employment rate (% of working age)	74.8%	70.8%	70.7%	70.3%	67.6%	66.4%	66.0%
Net commuting (000's)	10	-2	-3	-8	-13	-18	-23
Housing stock (000's)	425	490	494	510	525	541	557
Households (000's)	417	496	501	523	545	568	592
<b>Scenario: Heathrow closes in 2029 plus redevelopment 2030-2050</b>	<b>2012</b>	<b>2029</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>
Population (000's)	1,121	1,282	1,291	1,350	1,437	1,515	1,599
Working age population (000's)	738	839	843	881	966	1,021	1,071
Migration (000's)	2	-13	-4	5	5	4	4
Employees (000's)	560	563	566	583	604	620	637
Self employment (000's)	68	69	69	71	73	74	76
Total employment (000's)	630	632	635	653	677	695	713
People based employment (000's)	562	537	539	553	570	583	598
Unemployment (000's)	24	28	29	32	35	36	38
Unemployment rate (% of working age)	3.2%	3.3%	3.4%	3.6%	3.6%	3.6%	3.6%
Participation rate (% of working age)	78.0%	71.6%	73.1%	72.9%	70.3%	69.3%	69.0%
Residence employment (000's)	552	573	588	610	644	671	701
Residence employment rate (% of working age)	74.8%	68.3%	69.7%	69.3%	66.7%	65.7%	65.5%
Net commuting (000's)	10	-35	-49	-58	-74	-87	-103
Housing stock (000's)	425	487	490	514	550	582	617
Households (000's)	417	493	497	526	567	606	647
<b>Difference</b>	<b>2012</b>	<b>2029</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>
Population (000's)	0	-9	-9	9	55	94	136
Working age population (000's)	0	-8	-8	4	35	60	86
Migration (000's)	0	-9	0	9	9	8	9
Employees (000's)	0	-62	-62	-57	-48	-38	-30
Self employment (000's)	0	-8	-8	-7	-6	-5	-4
Total employment (000's)	0	-71	-71	-66	-55	-44	-33
People based employment (000's)	0	-61	-60	-55	-46	-37	-29
Unemployment (000's)	0	8	8	9	10	9	8
Unemployment rate (% of working age)	0.0%	0.9%	1.0%	1.0%	0.9%	0.7%	0.6%
Participation rate (% of working age)	0.0%	-1.6%	0.0%	0.0%	0.0%	0.0%	0.1%
Residence employment (000's)	0	-27	-14	-6	14	33	51
Residence employment rate (% of working age)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net commuting (000's)	0	-34	-46	-49	-61	-70	-80
Housing stock (000's)	0	-3	-3	4	24	42	60
Households (000's)	0	-3	-3	4	22	38	55

**Chart 5.3: Population in the Heathrow local area 2002-50, including redevelopment scenario**



The results in Table 5.3.2 reflect only one “residency based” scenario. As the site could be used for a number of different purposes, it would be possible to develop other scenarios in the future with different employment and GVA impacts to those described above.

It should also be noted that this is a broad, high level comparison. Further work would be required to refine these impacts. TfL have also indicated that further redevelopment opportunities exist at the Heathrow site and that a further 600ha of surrounding land could support new hotels and other facilities. The redevelopment of this area could be expected to further reduce the loss of local jobs and GVA.



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