



Inner Thames Estuary Feasibility Study

Response to Airports Commission Call for Evidence

**The Mayor of London's Submission:
Supporting technical documents**

23 May 2014

Title: Regional Economic Impacts of Improved Connectivity

Author: York Aviation/Oxford Economics

Purpose of paper:

To identify the level of service to UK regional cities that would develop as a result of added capacity provided by a new hub airport, and the positive economic impacts that would result.

Key messages:

- A new hub airport would provide sufficient additional runway capacity to boost frequencies of service to the 7 UK cities currently served from Heathrow, and to establish frequent connections to 9 new regional cities.
- This would improve prospects in each of these cities across a wide range of sectors.

UK Domestic Aviation Connectivity: *The impact of a new four-runway hub*

Full Report

May 2014

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Oxford Economics Report

Executive Summary

Key Points

The context for this report is the capacity constraints at Heathrow today and their adverse impact on the global connectivity available to the nations and regions of the UK. As noted by the Airports Commission noted in its Interim Report:

“Domestic connections at Heathrow and other London airports are of economic significance for both London and the regions. The regions benefit both from access to the capital’s economy and from the long-haul connectivity they can access via Heathrow.”

Since 1990, 11 UK airports have lost air service connections to the Heathrow hub. Even for those cities which have retained their direct air service connections, the number of daily flights has fallen and there is less competition in the market.

The erosion of access for the regions to the hub has resulted in poorer connectivity to London overall but, perhaps more importantly, their connectivity to destinations globally has also suffered. This has negative implications for regional economic performance.

Whilst connections from UK regional points to Heathrow have declined, other European hubs have been able to maintain their connections to smaller regional points, including those in the UK.

There appears to be little scope for the future of domestic air service connections to be secured by administrative means. Only by ensuring that there is sufficient airport capacity in place at the main hub can regional connectivity to London and beyond be secured for the longer term.

For the purpose of the current work, we have assumed that a new hub would be located to the East of London. We compare the impact of a new Four Runway Hub with the constrained situation in the event of no new runway being constructed in the London area and against the situation where there is an additional runway at the existing hub at Heathrow in order to assess the extent to which the UK regions would benefit.

Airports in the regions stands to benefit because:

- there will be sufficient runway capacity to ensure that growth in international services will not crowd out otherwise viable domestic air service connections; and
- the wider range and frequency of global air services will allow more connections to be made, so increasing demand for these domestic services and improving their viability for the airlines.

This report sets out how we have analysed the scope for a Four Runway Hub to add regional connectivity and sets out the potential benefits to passengers, airports and wider regional economies.

Key Points

Our analysis shows that without the provision of additional hub airport capacity, connections to the UK regions will continue to be eroded over the period to 2050.

Whilst services will remain to the main airports providing high volumes of connecting passengers, namely Aberdeen, Manchester, Edinburgh, Glasgow and Belfast, these will see numbers of daily flights being further eroded with consequent reductions in the efficiency with which global connections can be made.

The recently reintroduced connection to Leeds Bradford is unlikely to be retained and there is no realistic prospect of any other regional services gaining and sustaining access to Heathrow.

Whilst point to point connections to the other London airports will provide valuable links to London and HS2 will improve connectedness to the Midlands and North of England, these will not address the need for global connectedness.

Many regional airports have connections to European hubs and some to hubs further afield, particularly in the USA and Middle East, but these hubs are less likely to provide convenient high frequency hub connections to all parts of the globe that could be offered by an effective UK hub founded on the sheer strength of the London market itself.

Overall, in 2050, a New Hub Airport would provide 63 more daily regional air connections than if no additional hub airport capacity is provided, which is 43 more than today and 49 more than Heathrow could sustain with a third runway.

Those airports with existing services to Heathrow all see an increase in the number of daily flights compared to that which might otherwise operate to a constrained Heathrow in 2050.

Leeds Bradford retains/regains the its service and 8 additional regional points are able to gain or regain hub connections.

These additional flights would enable over 5 million more domestic passengers to use the UK's air hub, generating nearly £570 million of economic benefits to passengers and the airports combined. The wider impact on the regional economies would be nearly £2.1 billion a year.

Key Points

In terms of the impacts for the regions around each airport, these can be categorised as follows:

- High Traffic Impact / High Economic Impact - Aberdeen, Edinburgh and Glasgow where high volumes of passengers stand to benefit from improved frequencies of service, delivering substantial economic benefit.
- Peripheral Regions / High Impact – Belfast, Dundee, Inverness, Newquay and Plymouth where economies are smaller so the scale of economic benefit is less, but where increased frequencies or the reintroduction of hub connections deliver significant benefits to peripheral areas of the UK which are currently poorly connected.
- Major Cities with Low Global Connectivity / High Impact – Durham Tees Valley, Leeds Bradford, Liverpool, Cardiff and Humberside where the reintroduction, or retention of services, deliver strong benefits in terms of hub connectivity and regional economic performance.
- Limited Impact – Manchester and Newcastle where the relative increase in connectivity and economic performance is significantly smaller.

Our analysis demonstrates why having a strong hub airport serving the UK is vital not just to London but to the economic performance of the UK regions, particularly the more peripheral regions.

1. Background and Context

Context

The context for this report is the capacity constraints at Heathrow today and their adverse impact on the global connectivity available to the nations and regions of the UK.

The Airports Commission noted in its Interim Report:

“Domestic connections at Heathrow and other London airports are of economic significance for both London and the regions. The regions benefit both from access to the capital’s economy and from the long-haul connectivity they can access via Heathrow.”

“Capacity constraints at Heathrow have also affected domestic connectivity to the airport. While other hubs are attracting more transfer traffic from the UK, Heathrow remains a key access point to international and long-haul travel for many passengers from other UK airports.”

“Connections to other hubs in Europe and the Gulf are a welcome addition to the connectivity available from the UK’s regional airports, but they are not generally considered to be a replacement for links to Heathrow. Heathrow offers strong connectivity to a number of important markets, particularly in North America, which is hard to replicate elsewhere.”

“In terms of overall connectivity, whereas London’s connectivity is on a clear upwards trend since the effects of the recession, the weakening in links to Heathrow has contributed to a continuing decline in (UK) connectivity as measured using the IMF weightings.”

Lack of effective connections to the hub can damage the prospects for regional economies, particularly in terms of attracting inward investment and inbound tourism. It can also impact on indigenous businesses which face increased costs in trading overseas.

In this report, we set out to examine the importance of global connectivity to the UK regions and the extent to which an unconstrained (Four Runway) hub airport is required to provide the step-change in capacity that can enable that access to markets.

Why Connectivity Matters?

Air connectivity is as important to the UK regions as it is to London. Air connectivity has a wider impact than simply direct or indirect employment or income creation or even wider benefits to passengers and the sector itself.

Air connectivity can generate wider economic benefits through the impact it has on:

- Foreign Direct Investment;
- Trade;
- Tourism;
- Labour Market;
- Agglomeration effects.

The effects were explained further in the paper *The Economic Value of International Connectivity April 2013*.

Surveys, such as the *Cushman & Wakefield European Cities Monitor*, provide significant evidence of the importance of international connectivity in influencing company location decisions. This survey consistently identifies factors such as transport links with other cities and internationally and ease of access to markets, clients and customers as amongst the most important factors in company location decisions. For the UK regions, where global connections often need to connect via hub, the quality and frequency of such connections will be key.

Equally, air connectivity can be a significant factor in facilitating trade as it is effective at reducing the perceived distance between markets. Good connectivity can dramatically reduce the time it takes to reach some markets, reducing perceived distances and offsetting the impacts of unfamiliarity. There is also the potential for air connectivity to enable firms to spread competition beyond simply price by improving customer service and support, potentially counteracting the final factor in some markets. Hence, good connections via the hub can improve regional competitiveness.

Air connectivity also facilitates tourism in the regions. The absence of air connections between London and key regional cities makes them potentially less attractive to inbound tourists visiting the UK.

Air connectivity also has a role in supporting the labour market in the regions, particularly as such air accessibility is important particularly to high value added individuals who often provide specialist services, contributing to productivity and enhancing the competitiveness of the regions. Hence, the availability of air service connectivity has implications for the long term labour supply for the home economy.

In turn, such factors can influence the development of agglomerations and the achievability of the associated productivity and other benefits.

Regional Connectivity Today

The findings of this report needs to be seen within the context of the erosion of domestic air service connections to Heathrow over the last 20 years and the opportunity which a new four runway hub offers to reinstate lost connections and to improve the air connectivity of the UK regions overall.

Since 1990, 11 UK airports have lost air service connections to the Heathrow hub



- Birmingham
- Durham Tees Valley
- East Midlands
- Guernsey
- Humberside
- Inverness
- Isle of Man
- Jersey
- Liverpool
- Newquay
- Plymouth

Even for those cities which have retained their direct air service connections, the frequency of those connections has fallen and there is less competition in the market:

- Aberdeen
- Belfast (now Belfast City)
- Edinburgh
- Glasgow
- Leeds Bradford
- Manchester
- Newcastle

The erosion of access for the regions to the hub has resulted in poorer connectivity to London overall but, perhaps more importantly, their connectivity to destinations globally has also suffered.

How Heathrow compares with European Hubs

Whilst connections from UK regional points to Heathrow have declined, other European hubs have been able to maintain their connections to smaller regional points, including those in the UK. As we illustrate:

- they serve substantially more either domestic destinations or international destinations within 2 hours flying time;
- they offer connections to cities with smaller air markets.

It is notable that Amsterdam and Paris serve significantly more UK regional points than Heathrow - 20 and 13 respectively (including the Channel Islands) in July 2014, compared to 7. Not all of the services are operated by the hub carrier.

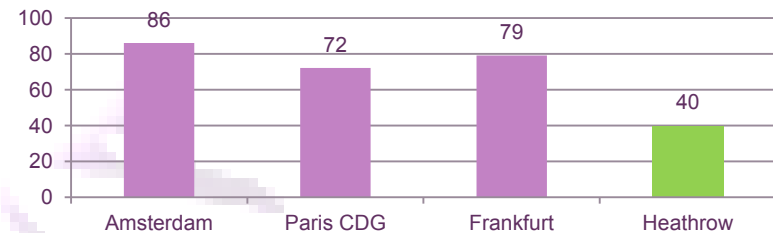
There are number of factors behind why European hubs have sustained a higher level of domestic or short distance connections. The most notable is the airport capacity constraints at Heathrow; without a free supply of slots airlines are forced to make trade-offs between routes in order to maximise profitability. More lucrative long-haul routes take priority over less profitable domestic services.

Airline behaviour adapts to the capacity constraints which leads to:

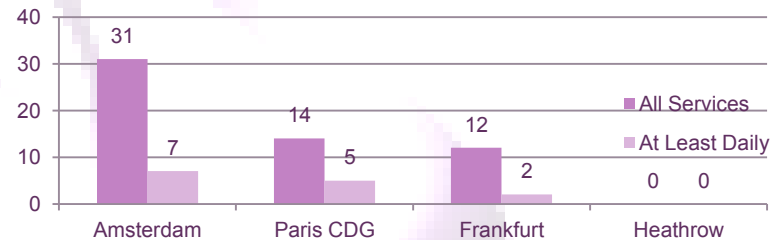
- a drive to maximise revenue from every slot;
- a loss of flexibility in airlines' operational profiles;
- risk aversion and a slowness to develop new routes.

Whether a route survives at a constrained hub thus becomes a question of both absolute viability and relative profitability. This disproportionately affects domestic routes.

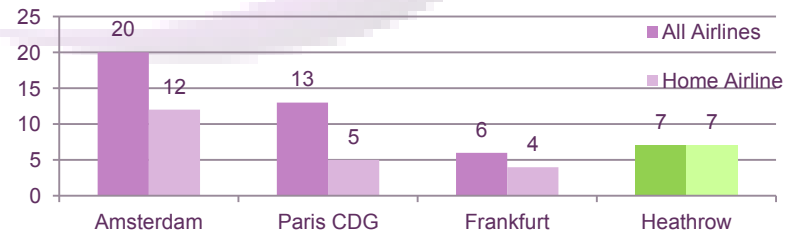
Number of Domestic and Sub 2 Hour Connections



Number of Airports Served with Less than 1 Million Passengers per annum



Number of UK Regional Airports Served





2. Which Cities and Regions will Benefit?

Approach

We have examined the domestic air service connectivity between the regions and London and how these are impacted by the provision of a new four runway hub. We have then looked at what this means for the individual regional or local economies. This work builds on earlier work carried out by York Aviation (YAL) and Oxford Economics (OE) on the potential route network from a new hub and the overall economic value of such a hub.

For the purpose of the current work, we are assuming that a new hub would be located to the East of London. We compare the impact of a new Four Runway Hub with the constrained situation in the event of no new runway being constructed in the London area and against the situation where there is an additional runway at the existing hub at Heathrow. We have not explicitly considered the scenario where there is one additional runway at Gatwick as this is likely to deliver connectivity somewhere between the constrained and Heathrow R3 scenarios based on our previous work on global connectivity.

There are four elements to this work:

- estimate the improvements to regional air connectivity with the additional capacity offered by a four runway hub;
- set out the economic benefits to the regions and city regions from the additional regional air connectivity provided by a four runway hub;
- profile the economic performance and potential of the regions/city regions and assess the combined benefits of a new hub, with the additional domestic air service connectivity it would provide;
- consider the mechanisms for ensuring regional flights gain access to the new hub.

YAL has been responsible for assessing the implications for regional air service connectivity and in assessing the benefits which will be derived by the users of these services. OE have examined the wider implications for the regional economies more generally.

Our findings region by region are set out in later in this report.

Which Cities might Benefit?

The starting point was a long list of airports serving the UK regions potentially connected to an unconstrained London hub. This comprised those cities which currently have an air service connection to Heathrow, those which have had connections previously or are connected to another London airport, as well as a small number of airports which have not benefitted from a connection to the hub since well before 1990, if at all. This included airports in Northern Ireland, Scotland and Wales but we did not consider the Channel Islands and Isle of Man, which may also stand to benefit.

These airports stand to benefit from the provision of a four runway hub because:

- there will be sufficient runway capacity to ensure that growth in international services will not crowd out otherwise viable domestic air service connections; and
- the wider range and frequency of global air services will allow more connections to be made, so increasing demand for these domestic services and improving their viability for the airlines.

This list was divided into three broad categories:

Airports with a current service to the Heathrow hub in 2014

Aberdeen
Edinburgh
Glasgow
Belfast City*
Newcastle
Manchester
Leeds Bradford

Airports with a service to other London airports and likely to have services to a new hub

Inverness
Dundee
Derry
Belfast International*
Durham Tees Valley
Liverpool
Cardiff
Newquay

Airports which have the potential to have services to a new hub

Prestwick
Carlisle
Blackpool
Humberside
Doncaster Sheffield
Anglesey
Swansea
Exeter
Plymouth

As explained in an Appendix, we narrowed down the list for detailed consideration based on the comparative air/rail journey times taking HS2 into account, the scale and nature of the market for air travel to and from London, the local GVA per capita and the number of foreign owned firms as well as the extent to which the local market was also served from neighbouring airports. As a consequence, Prestwick, Carlisle, Blackpool, Doncaster Sheffield, Anglesey, Swansea and Exeter airports were considered unlikely to gain new London hub connections even with a Four Runway Hub airport.

**the two Belfast Airports were considered together for the purpose of this analysis.*

What future scenarios have we looked at?

Scenario	Potential Issues & Risks
A new Four Runway Hub	<p>Even at 2050, a four runway hub will be operating with spare capacity.</p> <p>The constraint dynamics that are so damaging to domestic services at a congested Heathrow, even with a third runway, are not present.</p> <p>Airlines can operate more diverse fleets to enable better matching to different sized markets.</p> <p>Peak slot availability will allow air services to compete effectively in point to point markets.</p>
No expansion at the Heathrow hub	<p>No scope for new regional points to be served.</p> <p>Risks to existing services of two types:</p> <ul style="list-style-type: none"> • The first risk would be the total suspension of a route as the slots become increasingly attractive for use by more profitable opportunities. Current lower volume, lower frequency routes are most likely to be vulnerable, for example the current service to Leeds/Bradford. • The second risk could be applied to all routes and would involve some loss of frequency to free slots for other uses, albeit we would expect that the hub carrier would seek to increase aircraft size on these services to compensate. However, such a frequency reduction, even if it is offset by larger aircraft, will erode the benefits to the regions by increasing the connection times required at the hub or may, in some cases, make it impossible to make connections to and from some services. Several existing services have already seen a significant decline in frequency to Heathrow e.g. Glasgow and Edinburgh. <p>The Airports Commission predicted that the number of domestic routes would fall to just four without an increase in runway capacity.</p>
A third runway at Heathrow	<p>The Airports Commission noted that: <i>“A new runway at Heathrow would be very well-used, with the expanded airport operating at around 80-90% of capacity by 2030.”</i> By 2050, this will be even higher at similar levels to today given the expectation that demand overall may double.</p> <p>International best practice for average runway utilisation is 70-75% even at hub airports. Above this level, the airport suffers from significant resilience issues and slots are not available at busy periods.</p> <p>As noted above, the Airports Commission expects that a 3-runway hub would effectively be full shortly after opening and, therefore, is unlikely to lead to the introduction of any new domestic routes on a sustainable basis.</p> <p>Peak slots will be dominated by the most profitable long-haul flights. Domestic routes need large volumes of point to point travellers and without access to peak slots these will not be viable.</p> <p>Some new regional routes are only sustainable with smaller aircraft and these are unlikely to be launched from a constrained Heathrow. The smaller aircraft necessary to support such regional routes are still likely to be priced-out by larger aircraft for efficient slot use.</p>

Where do we predict will be served?

In both the constrained cases, with and without a third runway at Heathrow, one existing route - to Leeds/Bradford - would be lost again.

With a new, 4-runway hub, the Leeds/Bradford route would be retained and an additional eight new routes could be viable – a net gain of nine new regional routes over the constrained cases - as follows:

Inverness
Dundee
Durham Tees Valley
Liverpool
Cardiff
Newquay
Humberside
Plymouth

and the retained service to Leeds Bradford

The methodology by which we identified these routes as likely to be served is described in the Appendices to this report.

Summary of Regional Connectivity to London Hub

	Constrained no expansion Case	3rd Heathrow Runway Case	New 4- runway Hub case
Continued Existing Hub Routes	6	6	7
New Hub Routes	0	0	8
Total	6	6	15
Net Gain With New Hub	-	-	9

How will these routes benefit regional economies?

Sources of Direct Benefits to Passengers & Airports

We have focussed on considering two types of economic effect for each route:

- the direct economic benefits to passengers and airports;
- the wider economic impacts on city GVA from the effect of improved connectivity on productivity.

In both cases, the estimated impacts compare the difference between the potential expansion cases, a third runway at Heathrow and a four runway hub, and a base where no expansion in capacity takes place.

Direct Benefits to Passengers & Airports

Where routes improve accessibility either to London or international destinations, this results in benefits to passengers such as those shown opposite. Using transport appraisal techniques, we have estimated these benefits in a monetised form.

Similarly, where the development of capacity results in new routes to London or growth on existing routes, this can result in additional revenues to the local airport, which ultimately means greater prosperity locally.

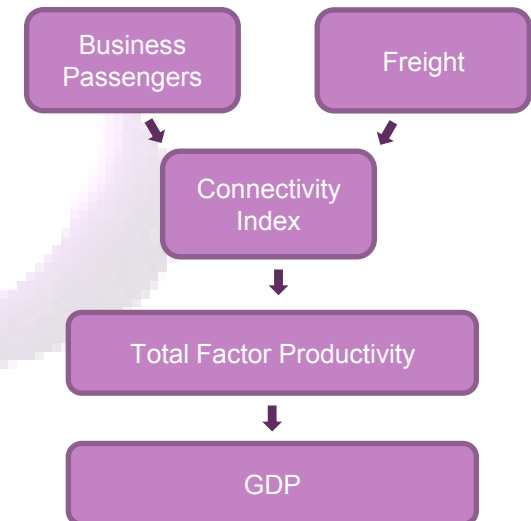
Wider Economic Impacts on City GVA

The assessment of the GVA impacts in the wider economy of the expansion of domestic connectivity through the development of a new hub is taken from work undertaken Oxford Economics. This work builds on OE's past modelling of the long run effects of improvements in air connectivity and its recent work for Transport for London on a new hub airport for the UK.

The modelling approach adopted in that study involved the construction of an index of connectivity which measured the benefits generated by an increase in business passengers and freight. Full details of the approach taken by OE can be found in a separate report appended to this document.



Overview of Oxford Economics Wider Economic Impacts Model





How can we help secure domestic connections?

Potential Mechanisms to secure these domestic connections?

A key consideration is whether there are mechanisms which might secure the future of regional connections to Heathrow in the absence of sufficient airport capacity. It is clear that, to the extent that there are such mechanisms, they have not proved effective in the past. Each of the available mechanisms have their limitations and the scope for regulatory intervention to ensure improved regional connectivity is narrow.

Slot Allocation

Currently, there is no provision to reserve slots at a coordinated airport for domestic services. Although the EU is considering proposed changes to the rules, these changes will principally be to allow more overt trading of slots. This has already happened to a large extent at Heathrow and accelerates the process whereby larger aircraft and higher earning long haul routes are replacing short haul and domestic connections. Although some priority is given to new entrant airlines in the allocation of any new slots made available, there is no mechanism for making new slots available at an airport which is otherwise congested.

Public Service Obligation (PSO)

A PSO can be imposed on a domestic air service connection linking London with a peripheral or development region or for a thin route. A PSO can only apply where there is no alternative rail or air service from an airport within 60 minutes surface access time. The criteria for a PSO is judged in terms of accessibility to London rather than connectivity to the hub. PSOs may be useful in certain circumstances but can never provide a full solution to the problem of declining regional connectivity.

Pricing

The form of airport charges regulation currently applied at Heathrow encourages 'efficient pricing', aimed at maximising passenger throughput. As such, this makes it less attractive to use the Airport for smaller aircraft operations, as is seen in the cases brought (unsuccessfully) by bmi and Aer Lingus that Heathrow charges were discriminating against short-haul services using smaller aircraft.

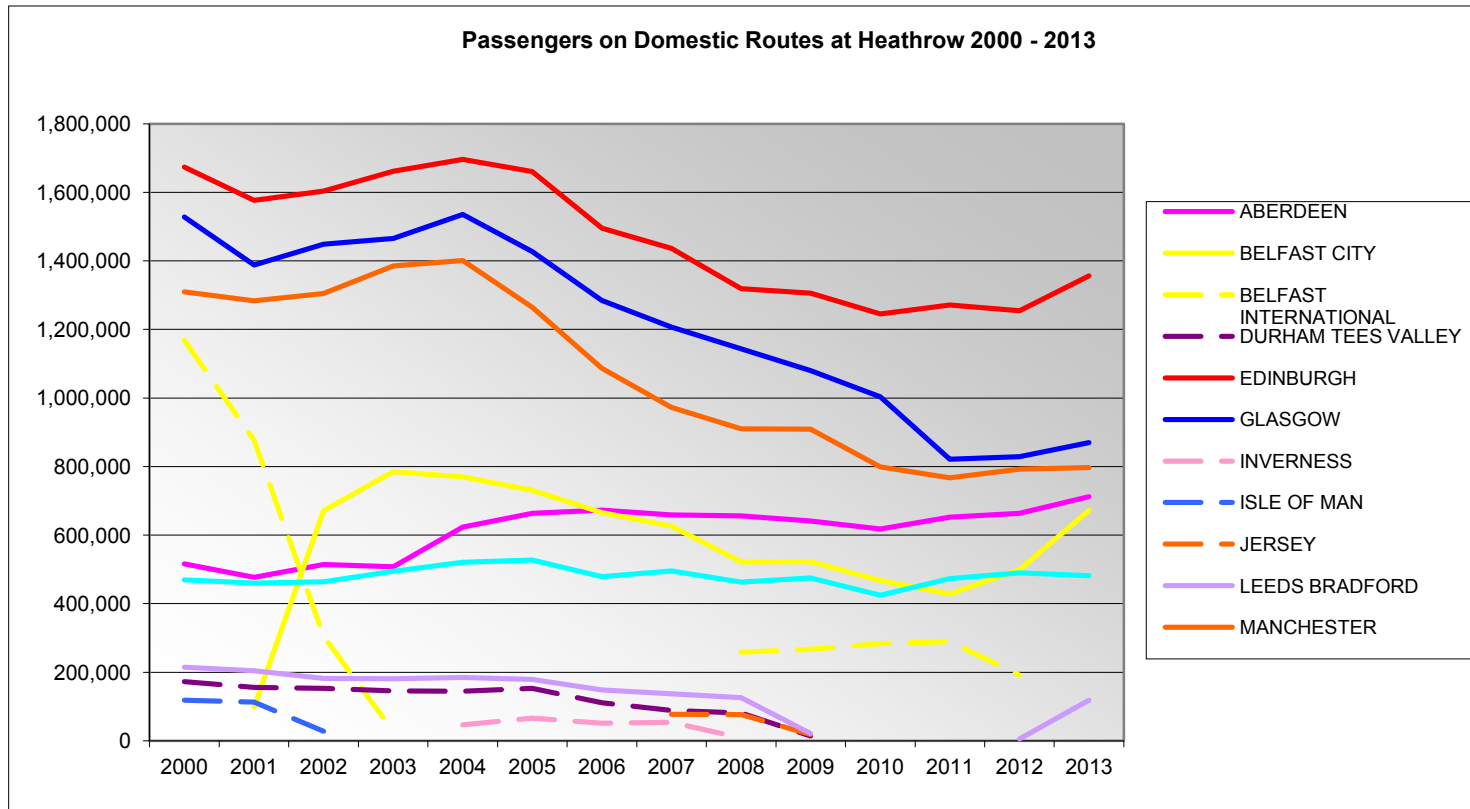
Air Passenger Duty

A further factor in the reduced attractiveness to the airlines of operating domestic feeder services has been the rising rate of APD, which is also charged in both directions on domestic services. However, APD cannot be differentially reduced for domestic services which have to be taxed on a common basis with at least those within the EU (as per the Irish travel tax discrimination case).

In practice, there appears to be little scope for the future of domestic air service connections to be secured by administrative means. Only by ensuring that there is sufficient airport capacity in place at the main hub can regional connectivity to London and beyond be secured for the longer term.

What level of demand is required to ensure that domestic connections are sustainable?

A further consideration is the level of passenger demand at which a regional connection to the hub is sustainable.



Source: CAA Statistics

Historically, routes were sustainable at Heathrow at around 150,000 passengers per annum but currently, the threshold has risen to around 400,000 passengers per annum as smaller routes have been squeezed out.

In the light of this, we have assumed a threshold of 185,000 passengers per annum, plus the existence of a mix of point to point and connecting passengers, as the minimum necessary to sustain a hub connection in 2050 in the case of a new Four Runway Hub with

By contrast, feeder connections to Amsterdam from UK regional points appear to be viable at a threshold of around 100,000 passengers per annum and some lower frequency regional carrier operations may be sustained at annual passenger volumes of only 30,000 passengers.

Summary Conclusions

Key Conclusions

Our analysis shows that without the provision of additional hub airport capacity, connections to the UK regions will continue to be eroded over the period to 2050. Whilst services will remain to the main airports providing high volumes of connecting passengers, namely Aberdeen, Manchester, Edinburgh, Glasgow and Belfast, these will see frequencies of service being further eroded with consequent reduction in the efficiency with which global connections can be made.

The recently reintroduced connection to Leeds Bradford is unlikely to be retained and there is no realistic prospect of any other regional services gaining and sustaining access to Heathrow. Whilst point to point connections to the other London airports will provide valuable links to London and HS2 will improve connectedness to the Midlands and North of England, these will not address the need for global connectedness.

Many regional airports have connections to European hubs and some to hubs overseas, particularly in the USA and Middle East, but these hubs are less likely to provide convenient high frequency hub connections to all parts of the globe that could be offered by an effective UK hub founded on the sheer strength of the London market itself.

Overall, in 2050, a New Hub Airport would provide 63 more daily regional air connections than if no additional hub airport capacity is provided, which is 43 more than today and 49 more than Heathrow could sustain with a third runway. Those airports with existing services to Heathrow all see a gain in frequency compared to that which might otherwise operate to a constrained Heathrow in 2050. Leeds Bradford retains/regains its service and 8 additional regional points are able to gain or regain hub connections. These additional flights would enable over 5 million more domestic passengers to use the UK's air hub, generating nearly £570 million of economic benefits to passengers and the airports combined. The wider impact on the regional economies would be nearly £2.1 billion a year.

In terms of the impacts for the regions around each airport, these can be categorised as follows:

- **High Traffic Impact / High Economic Impact** - Aberdeen, Edinburgh and Glasgow where high volumes of passengers stand to benefit from improved frequencies of service, delivering substantial economic benefit.
- **Outer Regions / High Impact** – Belfast, Dundee, Inverness, Newquay and Plymouth where economies are smaller so the scale of economic benefit is less, but where increased frequencies or the reintroduction of hub connections deliver significant benefits to outer areas of the UK which are currently poorly connected.
- **Major Cities with Low Global Connectivity / High Impact** – Durham Tees Valley, Leeds Bradford, Liverpool, Cardiff and Humberside where the reintroduction, or retention of services, deliver strong benefits in terms of hub connectivity and regional economic performance.
- **Limited Impact** – Manchester and Newcastle where the relative increase in connectivity and economic performance is significantly smaller.

Our analysis demonstrates why having a strong hub airport serving the UK is vital not just to London but to the economic performance

Summary of New Hub Impact compared to the Base Case

In the table below, we summarise the key impact on domestic air service connectivity and regional economic performance which a New Hub could provide compared to the Base Case where no additional hub capacity is provided by 2050. Full details are set out in the following section.

	Additional Daily Flight Frequency	Additional Passengers (000s)	Economic Benefits to Passengers and Airports (£m)	Wider Economic Benefits	
				GVA (£m)	Jobs (000s)
Aberdeen	7	693	38.1	346	2.81
Manchester	2	124	5.2	66	0.46
Edinburgh	9	891	44.7	451	2.59
Glasgow	7	680	38.3	358	2.62
Belfast	3	223	36.8	92	0.71
Newcastle	1	111	2.1	64	0.53
Leeds Bradford	3	186	37.1	103	0.78
Inverness	4	248	32.9	66	0.85
Dundee	6	371	88.7	139	1.18
Durham Tees Valley	4	446	46.8	220	2.18
Liverpool	5	309	67.0	120	0.98
Cardiff	3	165	18.9	56	0.41
Newquay	3	186	43.6	33	0.46
Humberside	3	186	13.8	79	0.81
Plymouth*	3	186	55.0	33	0.33

*subject to airport reopening

Summary of New Hub Impact compared to Runway 3

In the table below, we summarise the net impact which a New Hub could provide compared to a third runway at Heathrow.

	Additional Daily Flight Frequency	Additional Passengers (000s)	Economic Benefits to Passengers and Airports (£m)
Aberdeen	2	74	5.3
Manchester	1	0	2.5
Edinburgh	5	396	20.1
Glasgow	3	310	18.2
Belfast	2	99	19.1
Newcastle	1	111	2.1
Leeds Bradford	3	186	37.1
Inverness	4	248	32.9
Dundee	6	371	88.7
Durham Tees Valley	4	446	46.8
Liverpool	5	309	67.0
Cardiff	3	165	18.9
Newquay	3	186	43.6
Humberside	3	186	13.8
Plymouth*	3	186	55.0

*subject to airport reopening

City by City Impacts

Route Summary - Aberdeen

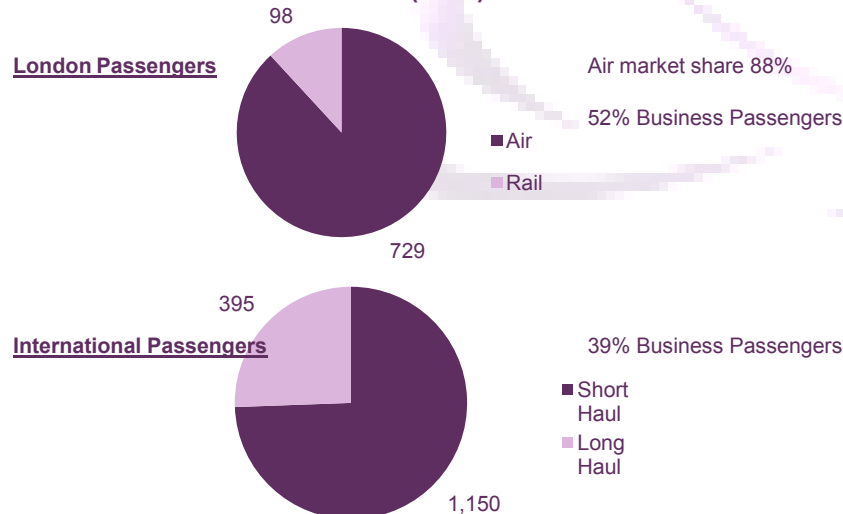
- Four Runway Hub offers seven more flights per day than the Base Case and two more than a Third Runway
- Four Runway Hub delivers £38 million per annum in direct benefits to users and the airport. £5.3 million more than a third runway
- It will deliver £346 million in GVA benefits and 2,810 jobs in the wider economy, particularly to the crucial Oil & Gas sector

Nature & Quality of Current Connections

Status of Heathrow Connection	Current service. 11 flights per day
Air Travel Time to Central London	155 minutes
Other London Air Services	LCY, LGW, LTN Total of 5 flights per day
Other Hub Services (Flights per day)	Amsterdam (5), Paris (3), Dublin (1), Frankfurt (3)
No. of Direct Rail Services & Travel Time to Central London	4 per day 420 minutes

Impact of HS2 on Travel Times: Around 45 minute improvement

Core Catchment Demand in 2013 (000s)



- Aberdeen is one of the most economically important centres in Scotland and one of the wealthiest areas of the UK outside of London. Its economic success has been built off the back of the oil & gas industry.
- It is expected to continue to be a powerful economy in the future, even as the focus of the oil & gas industry shifts from supply to provision of services and expertise.
- The current Heathrow service is well established, with BA and Virgin on the route. There is also significant connectivity to London's other airports. Rail journey times are significant and air market share is high.
- The airport is well connected to other hub airports, servicing the substantial base of international traffic, which has noticeably high business and long haul component.

Key Economic & Demographic Information

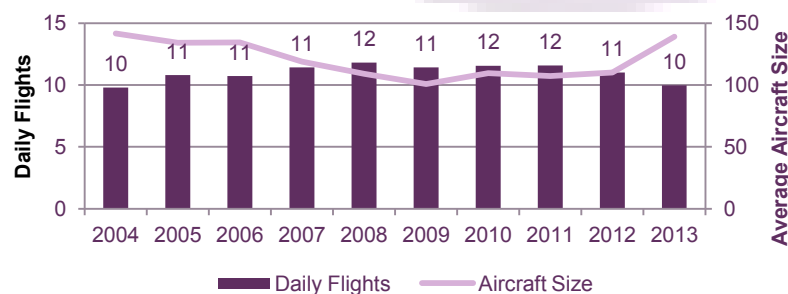
	2014	2050	CAGR
GVA (£m, 2010 prices)	£10,172	£20,942	2.0%
GVA per capita	£44,811	£84,444	1.8%
Population	227,000	248,000	0.2%
Key Sectors	Primary & Secondary industries, Professional Services		
Drivers of Growth	ICT, Admin & Real Estate, Professional Services		
Visitors in 2012	1.4 million domestic, 210,000 international		
Employment in Foreign Owned Companies	33,511		
FDI Jobs as a % of Total Employment in Nation / Region	0.2%		

Route Summary - Aberdeen

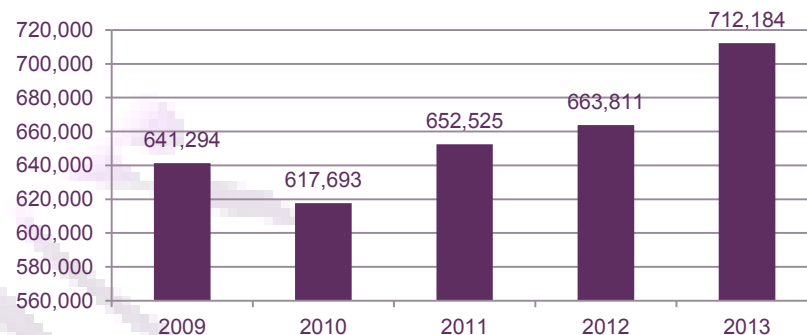
- The Heathrow route suffered a dip post recession but has since recovered strongly. Virgin Little Red's entry on to the route has coincided with strong growth in 2013.
- Looking forward, we believe the strength of the underlying market and the distance from London means that the route is in little danger of being dropped. However, with no expansion, we would expect a drop in the number of daily flights, although this is partially offset by the use of larger aircraft. This is reflected in the constrained Base Case.
- The addition of a third runway at Heathrow would increase capacity such that some growth in daily flights over today would be possible but this is still not optimal and is only partially offset by larger aircraft.
- An unconstrained hub allows both the largest passenger throughput and the highest number of frequencies, maximising connectivity for users. By 2050, the route would be carrying around 1.6 million passengers per annum, with a significant business component and nearly 700,000 onward connecting passengers.
- We do not believe that the growth of the service to a new hub would result in the withdrawal of any other hub services.

Clearly, these would not grow as much but their existing level of traffic would not be eroded.

Heathrow Route Average Daily Flights and Aircraft Size



Heathrow Route Passengers 2009 to 2013



London Hub Route Forecast (000s)

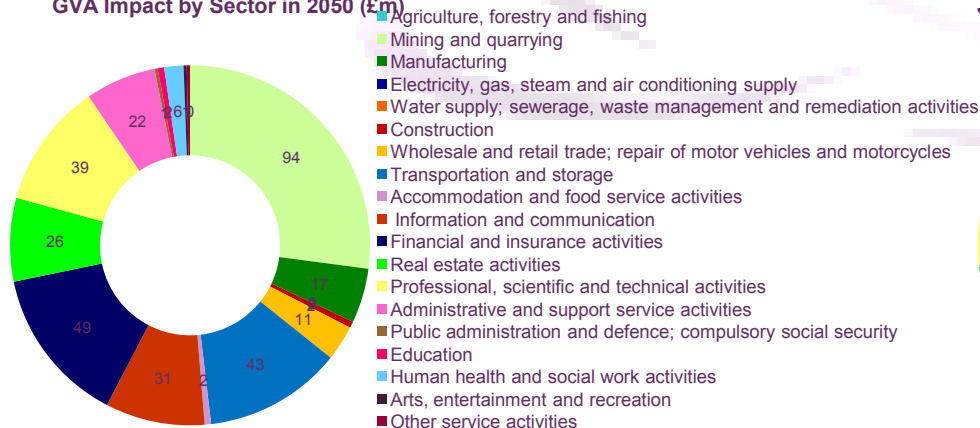
	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	409	492	843	886
Business	241	294	505	528
Leisure	167	198	339	358
Hubbing in London	304	374	642	674
Business	126	227	389	409
Leisure	178	147	252	265
Total	712	866	1,485	1,559
Business	367	521	894	936
Leisure	345	345	591	623
Daily Flights	11	7	12	14
Aircraft Size	139	200	200	180

Route Summary - Aberdeen

Additional City Region Economic Impacts Compared to the Base Case in 2050

Economic Benefits to Passengers and Airports (£m)			
	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£30.8	£35.9	£5.1
Travelling to London	£23.1	£25.8	£2.6
Business	£19.2	£21.3	£2.1
Leisure	£3.9	£4.5	£0.5
Hubbing in London	£7.7	£10.1	£2.4
Business	£6.4	£8.4	£2.0
Leisure	£1.3	£1.7	£0.4
Producer Benefits	£1.9	£2.2	£0.2
Total	£32.8	£38.1	£5.3
Impact in the Wider Economy – New Hub vs. Base Case			
GVA Impact (£m)	£346		
Employment Impact	2,810		

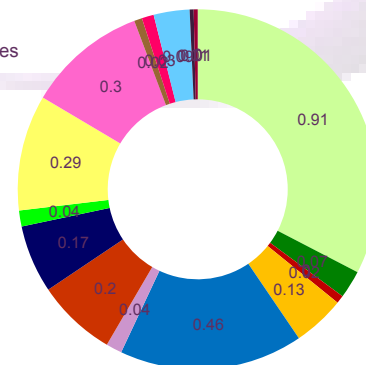
GVA Impact by Sector in 2050 (£m)



Key Messages

- Economic benefits to passengers and airports from expansion of capacity to London are driven by benefits to London bound passengers primarily. Without any expansion significant numbers of passengers are simply priced out of the market or are forced to switch to alternative modes.
- Those travelling to London would receive around £30.8 million in economic benefits in 2050 from the construction of Runway 3 at Heathrow. However, the construction of a four runway hub would result in user benefits of around £35.9 million.
- Benefits to passengers hubbing in London stem from increased frequencies reducing wait times. These are, however, more muted as the airport already offers significant hub connections.
- In total, Runway 3 would offer around £32.8 million in benefits in 2050, while a New Four Runway Hub would offer £38.1 million. This represents total additional economic benefits to passengers and the airport of around £5.3 million from the new hub compared to Runway 3.
- Impacts in the wider economy are significant, with the New Hub expected to support around £346 million in additional GVA in 2050 and 2,810 jobs. This focussed particularly in the mining and quarrying sector, which relates to the area's strength in Oil and Gas.

Jobs Impact by Sector in 2050 (000s)



Route Summary - Belfast

- Four Runway Hub offers three more flights per day than the Base Case and two more than a Third Runway
- Four Runway Hub delivers £37 million per annum in direct benefits to users and the airport. £19 million more than a third runway
- It will deliver £92 million in GVA benefits and 710 jobs in the wider economy, mainly in the Financial & Insurance Services sector

Nature & Quality of Current Connections

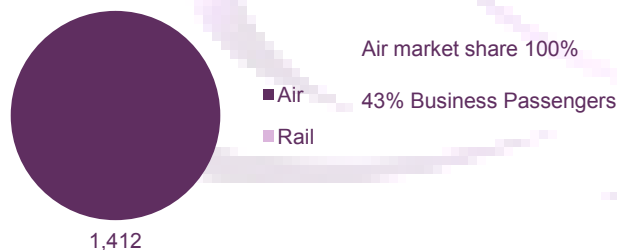
Status of Heathrow Connection	Current service. 9 flights per day
Air Travel Time to Central London	140 minutes
Other London Air Services	Gatwick 3 per day
Other Hub Services (Flights per day)	New York EWR (1)
No. of Direct Rail Services & Travel Time to Central London	None
Impact of HS2 on Travel Times	Not applicable
Air travel time to central London includes an allowance for transiting the airports and travel to the centre.	

- Belfast has grown steadily in recent years on the back of the more settled political situation.
- Part of its Heathrow service from Belfast City Airport was recently taken over by BA from bmi and is performing well alongside the Aer Lingus service. The route offers the city's main connection to London and is the only major European hub route. Belfast International has a daily service to New York Newark offering connectivity to North American destinations, as well as low fares services to Paris and Amsterdam.
- Clearly, given Northern Ireland's geographic location, rail competition is not a factor. The primary competition is in many ways Dublin Airport, which is used by around 550,000 Northern Ireland residents each year.

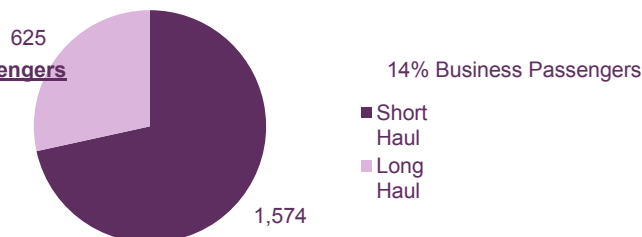
- Over international markets are relatively small. This may explain the relative paucity of hub connections currently.

Core Catchment Demand in 2013 (000s)

London Passengers



International Passengers

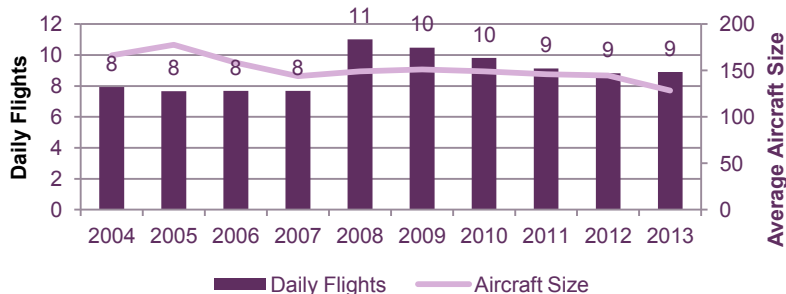


	2014	2050	CAGR
GVA (£m, 2010 prices)	£9,236	£21,626	2.4%
GVA per capita	£32,636	£72,570	2.2%
Population	283,000	298,000	0.1%
Key Sectors	Public Services, Admin. & Real Estate, Financial Services		
Drivers of Growth	ICT, Professional Services, Admin. & Real Estate		
Visitors in 2012	1.6 million international		
Employment in Foreign Owned Companies	28,458		
FDI Jobs as a % of Total Employment in Nation / Region	0.4%		

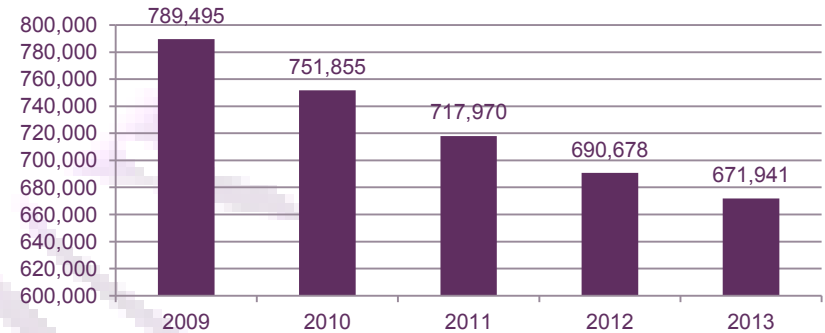
Route Summary - Belfast

- Passengers numbers on the Heathrow service have steadily declined over recent years but this most likely reflects bmi's difficulties prior to its acquisition by BA. Some point to point passengers may have switched to low fares or regional services to other airports
- Moving forward, we would anticipate the route being impacted constraints in London. However, clearly it is not affected by HS2 or rail competition more generally. Consequently, in the Base Case, we would anticipate the number of daily flights remaining as current, but some growth being accommodated by larger aircraft. By 2050, with no expansion in London, we would expect passenger throughput to be around 1.1 million in the Base Case.
- Runway 3 would allow some limited increase in frequency, but ultimately constraints at Heathrow by 2050 would limit expansion to 10 flights per day and a passenger throughput of around 1.2 million.
- The New Hub would allow greater growth in flights per day but would see the service use slightly smaller aircraft. It would operate at 12 flights a day with a passenger throughput of 1.3 million in 2050.
- We do not believe that the growth of the service to a New Hub would result in the withdrawal of any other hub services.

Heathrow Route Average Daily Flights and Aircraft Size
Clearly, these would not grow as much but their existing level of traffic would not be eroded.



Heathrow Route Passengers 2009 to 2013



London Hub Route Forecast (000s)

	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	428	656	728	787
Business	188	357	396	412
Leisure	240	299	332	375
Hubbing in London	244	458	509	550
Business	73	288	320	345
Leisure	171	170	189	205
Total	672	1,114	1,238	1,337
Business	261	645	716	757
Leisure	411	469	521	580
Daily Flights	9	9	10	12
Aircraft Size	128	200	200	180

Route Summary - Belfast

Additional City Region Economic Impacts Compared to the Base Case in 2050

Economic Benefits to Passengers and Airports (£m)

	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£17.3	£36.2	£18.9
Travelling to London	£2.2	£3.7	£1.5
Business	£1.5	£2.0	£0.6
Leisure	£0.7	£1.7	£0.9
Hubbing in London	£15.2	£32.5	£17.4
Business	£12.2	£25.5	£13.3
Leisure	£3.0	£7.0	£4.0
Producer Benefits	£0.4	£0.6	£0.3
Total	£17.7	£36.8	£19.1

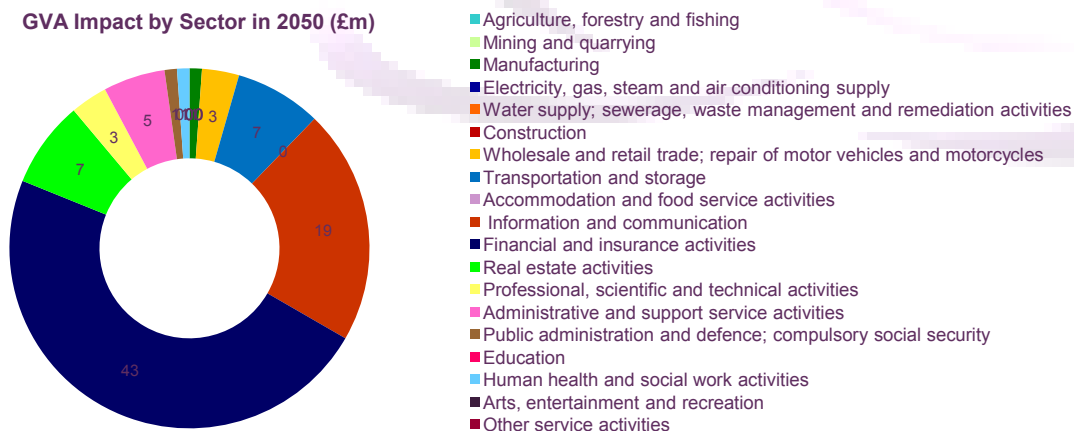
Impact in the Wider Economy – New Hub vs. Base Case

GVA Impact (£m)	£92
Employment Impact	710

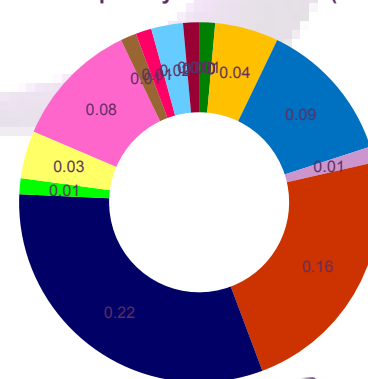
Key Messages

- The relatively limited constraint on London bound passenger numbers means that economic benefits to this group are relatively limited.
- Benefits to passengers hubbing in London are, however, more significant. With Heathrow currently the only major hub link from Northern Ireland constraint on the route compromises indirect international connectivity. Passengers are likely to have to travel further to access a hub service, potentially to Dublin, or will be reliant on another service being started from Belfast.
- Overall, we estimate:
 - economic benefits to passengers and the airport from Runway 3 of around £17.7 million per annum in 2050;
 - economic benefits to passengers and the airport from the New Hub of around £36.8 million per annum in 2050.
- The additional business travel enabled by the new hub compared to the Base Case would also result in around £92 million of GVA impacts and 710 jobs in the wider economy in 2050.

GVA Impact by Sector in 2050 (£m)



Jobs Impact by Sector in 2050 (000s)



Route Summary – Cardiff

- Four Runway Hub offers three more flights per day than the Base Case and three more than a Third Runway
- Four Runway Hub delivers £19 million per annum in direct benefits to users and the airport. £19 million more than a third runway
- It will deliver £56 million in GVA benefits and 410 jobs in the wider economy, concentrated in the Financial & Insurance Services sector

Nature & Quality of Current Connections

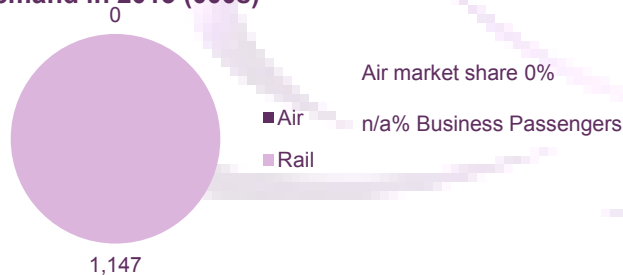
Status of Heathrow Connection	No service
Air Travel Time to Central London	122 minutes
Other London Air Services	None
Other Hub Services (Flights per day)	Amsterdam (3), Dublin (2)
No. of Direct Rail Services & Travel Time to Central London	29 119 minutes
Impact of HS2 on Travel Times	None

Air travel time to central London includes an allowance for transiting the airports and travel to the centre.

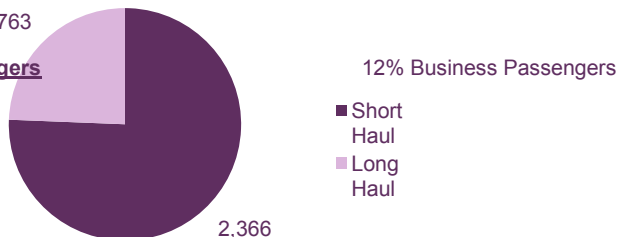
- Cardiff is a major UK city. It does not, however, currently have any air connections to London. This is a function of geography. Our assessment suggests that rail journey times are likely to be quicker to London. Rail also offers a high frequency of service.
- Cardiff does, however, have a three times daily service to the KLM hub at Amsterdam.
- International markets are of a reasonable size, including a substantial long haul component, albeit that this is heavily competed by Heathrow. This supports the presence of the Amsterdam hub service.

Core Catchment Demand in 2013 (000s)

London Passengers



International Passengers



Key Economic & Demographic Information

	2014	2050	CAGR
GVA (£m, 2010 prices)	£8,243	£18,854	2.3%
GVA per capita	£23,484	£52,518	2.3%
Population	351,000	359,000	0.1%
Key Sectors	Public Services, Financial Services, Admin & Real Estate		
Drivers of Growth	Professional Services, ICT, Admin & Real Estate		
Visitors in 2012	1.7 million domestic, 0.3 million international		
Employment in Foreign Owned Companies	34,727		
FDI Jobs as a % of Total Employment in Nation / Region	0.4%		

Route Summary – Cardiff

- Given Cardiff's proximity to London and the consequent difficulty any London service would, therefore, have in penetrating the point to point market, we do not believe that a service would operate either in the Base Case or with a third runway at Heathrow.
- A regional feeder service focussing primarily on onward connecting traffic will need to operate relatively small aircraft at high numbers of flights per day and we do not believe that such aircraft will operate from a constrained hub such as Heathrow in 2050, even with a third runway. Furthermore, the only areas of London where such a service might offer a time advantage would be in the East near to a new hub in the Estuary. Consequently, this is a more realistic prospect in developing some penetration in the London bound market.
- With a New Hub, with no constraints, it might however be possible to operate a three times a day service with a 100 seat aircraft, focussing on passengers hubbing in London. We would envisage such a service carrying around 165,000 passengers per annum in 2050.
- We do not believe that the growth of the service to a New Hub would result in the withdrawal of any other hub services. Clearly, these would not grow as much but their existing level of traffic would not be eroded.

London Hub Route Forecast (000s)

	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	0	0	0	56
<i>Business</i>	0	0	0	44
<i>Leisure</i>	0	0	0	12
Hubbing in London	0	0	0	109
<i>Business</i>	0	0	0	66
<i>Leisure</i>	0	0	0	43
Total	0	0	0	165
<i>Business</i>	0	0	0	110
<i>Leisure</i>	0	0	0	55
Daily Flights	0	0	0	3
Aircraft Size	-	-	-	100

Route Summary – Cardiff

Additional City Region Economic Impacts Compared to the Base Case in 2050

Economic Benefits to Passengers and Airports (£m)

	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£0.0	£18.8	£18.8
Travelling to London	£0.0	£1.2	£1.2
Business	£0.0	£1.1	£1.1
Leisure	£0.0	£0.1	£0.1
Hubbing in London	£0.0	£17.6	£17.6
Business	£0.0	£8.2	£8.2
Leisure	£0.0	£9.5	£9.5
Producer Benefits	£0.0	£0.1	£0.1
Total	£0.0	£18.9	£18.9

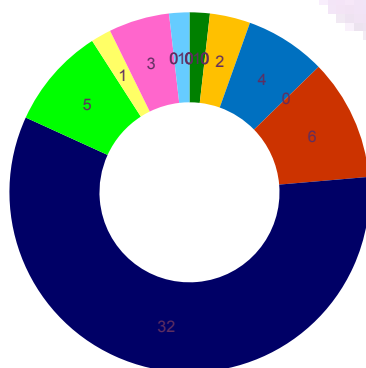
Impact in the Wider Economy – New Hub vs. Base Case

GVA Impact (£m)	£56
Employment Impact	410

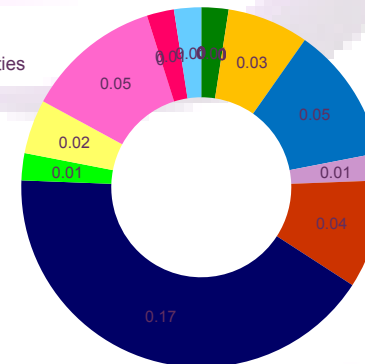
Key Messages

- The service in the new hub scenario offers economic benefits to passengers and the airport of around £18.9 million per annum in 2050.
- The primary driver of these benefits is improved accessibility to onward connections via the new hub. The service also enables additional London bound air travel that has benefits to those passengers.
- The impact in the wider economy from the new service to a four runway hub is estimated to be around £56 million in GVA and 410 jobs in 2050.

GVA Impact by Sector in 2050 (£m)



Jobs Impact by Sector in 2050 (000s)



Route Summary – Dundee

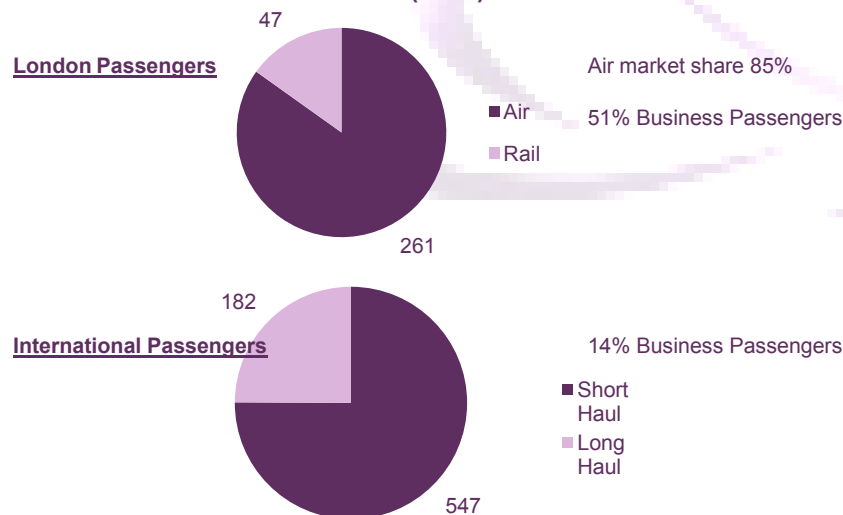
- Four Runway Hub offers six more flights per day than the Base Case and also six more than a Third Runway
- Four Runway Hub delivers £89 million per annum in direct benefits to users and the airport. £89 million more than a third runway
- It will deliver £139 million in GVA benefits and 1,180 jobs in the wider economy, principally in the Financial & Insurance Services and ICT sectors

Nature & Quality of Current Connections

Status of Heathrow Connection	No Service
Air Travel Time to Central London	150 minutes
Other London Air Services	Stansted – 2 per day
Other Hub Services (Flights per day)	None
No. of Direct Rail Services & Travel Time to Central London	4 343 minutes

Impact of HS2 on Travel Times 45 minute improvement
Air travel time to central London includes an allowance for transiting the airports and travel to the centre.

Core Catchment Demand in 2013 (000s)



- Dundee is a significant Scottish city located around an hour north of Edinburgh over the Firth of Forth.
- It has a small airport that currently offers a twice daily service to London Stansted supported by a Public Service Obligation, although until recently the service operated to London City Airport which may account for the high business share.
- Travel times via air are significantly faster than via rail and hence air has a significant market share, despite the limited existing service.
- International markets are relatively small, even by 2050, and there is currently substantial leakage to Edinburgh Airport.
- We have identified that there is currently a significant amount of leakage from the catchment area to services to London from Edinburgh.

Key Economic & Demographic Information

	2014	2050	CAGR
GVA (£m, 2010 prices)	£3,068	£6,349	2.0%
GVA per capita	£20,730	£40,184	1.9%
Population	148,000	158,000	0.2%
Key Sectors	Public Services, Trade & Hospitality		
Drivers of Growth	Professional Services, ICT, Admin & Real Estate		
Visitors in 2012	Domestic Visitors 0.7 million, 0.1 million International Visitors		
Employment in Foreign Owned Companies	2,053		
FDI Jobs as a % of Total Employment in Nation / Region	0.2%		

Route Summary – Dundee

- We do not believe that a Dundee service will be operating to Heathrow in 2050 in either the Base Case or even with a Runway 3.
- The constraint dynamic in both cases by 2050 will be such that the small aircraft needed to operate services from relatively small markets, such as those around Dundee, will be priced out in favour of more revenue intensive uses for the slot.
- However, with a four runway New Hub, these slot constraints will not exist and we forecast that a six times daily service using a 100 seat aircraft would be a viable proposition. The service would be slightly balanced towards London bound travellers, but there would also be a significant market for those seeking to hub in London. By 2050, we would anticipate this service handling around 371,000 passengers per annum.

London Hub Route Forecast (000s)

	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	0	0	0	211
<i>Business</i>	0	0	0	87
<i>Leisure</i>	0	0	0	124
Hubbing in London	0	0	0	160
<i>Business</i>	0	0	0	126
<i>Leisure</i>	0	0	0	35
Total	0	0	0	371
<i>Business</i>	0	0	0	213
<i>Leisure</i>	0	0	0	159
Daily Flights	0	0	0	6
Aircraft Size	-	100	100	100

Route Summary – Dundee

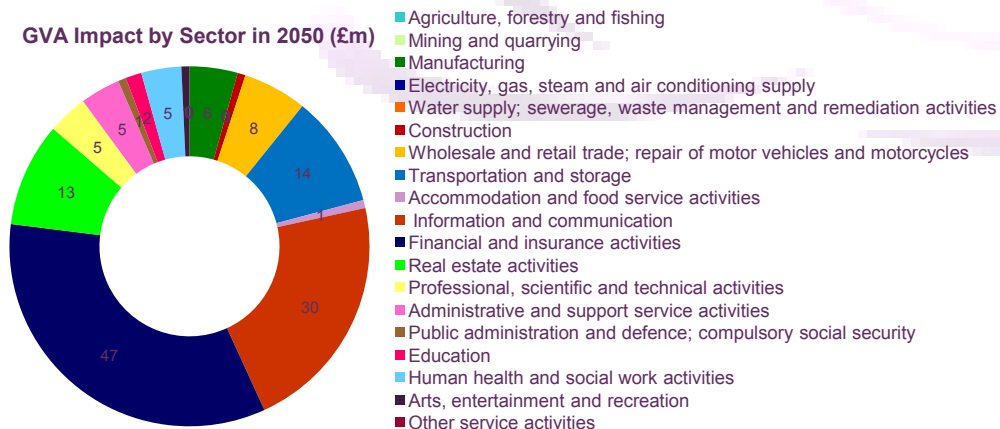
Additional City Region Economic Impacts Compared to the Base Case in 2050

Economic Benefits to Passengers and Airports (£m)			
	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£0.0	£86.3	£86.3
Travelling to London	£0.0	£21.6	£21.6
Business	£0.0	£15.4	£15.4
Leisure	£0.0	£6.2	£6.2
Hubbing in London	£0.0	£64.7	£64.7
Business	£0.0	£38.6	£38.6
Leisure	£0.0	£26.1	£26.1
Producer Benefits	£0.0	£2.4	£2.4
Total	£0.0	£88.7	£88.7
Impact in the Wider Economy – New Hub vs. Base Case			
GVA Impact (£m)		£139	
Employment Impact		1,180	

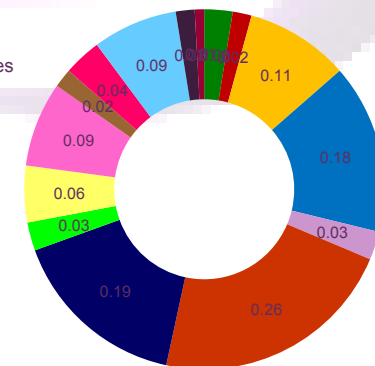
Key Messages

- The city's lack of air connectivity now, either in terms of substantive services to London or hub connections, means that economic benefits to passengers and the airport are significantly from improved accessibility.
- Those hubbing in London particularly would not have to travel to another airport to access hub services and make considerable gains.
- By 2050, we estimate that the New Hub service would result in £88.7 million per annum in economic benefits to passengers and the airport over and above either the Base Case or Runway 3.
- The impact on the wider economy from the increased level of business travel enabled by the new hub is also significant. In 2050, the new service would support around £135 million in GVA and 1,180 jobs.

GVA Impact by Sector in 2050 (£m)



Jobs Impact by Sector in 2050 (000s)



Route Summary – Durham Tees Valley

- Four Runway Hub offers four more flights per day than the Base Case and four more than a Third Runway
- Four Runway Hub delivers £47 million per annum in direct benefits to users and the airport. £47 million more than a third runway
- It will deliver £220 million in GVA benefits and 2,180 jobs in the wider economy, principally in the Financial & Insurance Services, ICT and Real Estate sectors

Nature & Quality of Current Connections

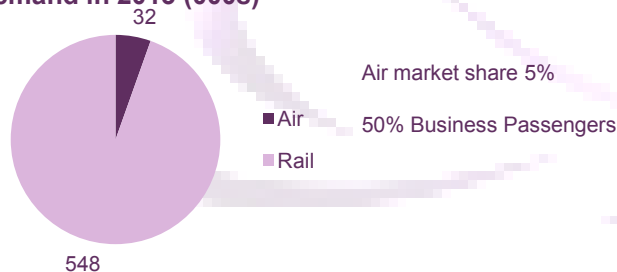
Status of Heathrow Connection	Lost service in 2009
Air Travel Time to Central London	131 minutes
Other London Air Services	None
Other Hub Services (Flights per day)	Amsterdam (3)
No. of Direct Rail Services & Travel Time to Central London	31 (from Darlington) 144 minutes

Impact of HS2 on Travel Times

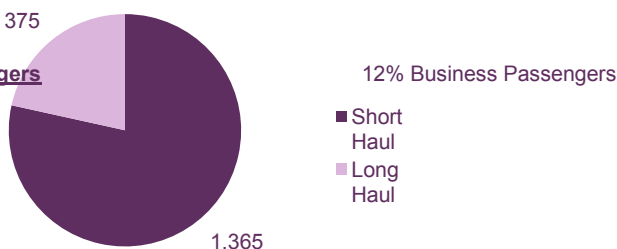
30 minute reduction
Air travel time to central London includes an allowance for transiting the airports and travel to the centre.

Core Catchment Demand in 2013 (000s)

London Passengers



International Passengers



- The Tees Valley is a significant, polycentric sub-regional economy.
- The airport had a Heathrow service until 2009, when bmi ceased operations at the airport.
- Its only current scheduled service is the three times daily service to Amsterdam operated by KLM.
- The rail journey time to London is competitive and consequently, although some passengers in the core catchment use the nearby Newcastle Airport, rail is dominant in the point to point market. This will be reinforced by HS2.
- International markets are mixed. There is a significant short haul market but the long haul market is limited, even by 2050. This, along with the proximity to the larger Newcastle Airport, helps to explain the limited current hub services.

Key Economic & Demographic Information

	2014	2050	CAGR
GVA (£m, 2010 prices)	£4,249	£9,134	2.1%
GVA per capita	£18,394	£36,831	1.9%
Population	231,000	248,000	0.2%
Key Sectors	Public Services		
Drivers of Growth	ICT, Professional Services, Admin & Real Estate		
Visitors in 2012	0.5 million domestic, 0.1 million international		
Employment in Foreign Owned Companies	47,558		
FDI Jobs as a % of Total Employment in Nation / Region	0.5%		

Route Summary – Durham Tees Valley

- We do not believe that a Durham Tees Valley service will be operating to Heathrow in 2050 in either the Base Case or even with Runway 3.
- The London bound market is relatively weak, given the level of rail competition, and onward hubbing markets are not large enough to support the service with the size of aircraft required for a constrained hub.
- A unconstrained New Hub would, however, allow a service to develop. We have assumed a four times daily service with a relatively large aircraft. The balance is very much towards connecting traffic but there is also a core of London bound demand.
- We envisage the route handling around 450,000 passengers in 2050.
- We do not believe that the growth of the service to a New Hub would result in the withdrawal of any other hub services. Clearly, these would not grow as much but their existing level of traffic would not be eroded.

London Hub Route Forecast (000s)

	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	0	0	0	121
<i>Business</i>	0	0	0	59
<i>Leisure</i>	0	0	0	62
Hubbing in London	0	0	0	325
<i>Business</i>	0	0	0	232
<i>Leisure</i>	0	0	0	93
Total	0	0	0	446
<i>Business</i>	0	0	0	291
<i>Leisure</i>	0	0	0	155
Daily Flights	0	0	0	4
Aircraft Size	-	-	-	180

Route Summary – Durham Tees Valley

Additional City Region Economic Impacts Compared to the Base Case in 2050

Economic Benefits to Passengers and Airports (£m)

	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£0.0	£46.8	£46.8
Travelling to London	£0.0	£22.8	£22.8
Business	£0.0	£19.3	£19.3
Leisure	£0.0	£3.6	£3.6
Hubbing in London	£0.0	£24.0	£24.0
Business	£0.0	£13.9	£13.9
Leisure	£0.0	£10.1	£10.1
Producer Benefits	£0.0	£0.0	£0.0
Total	£0.0	£46.8	£46.8

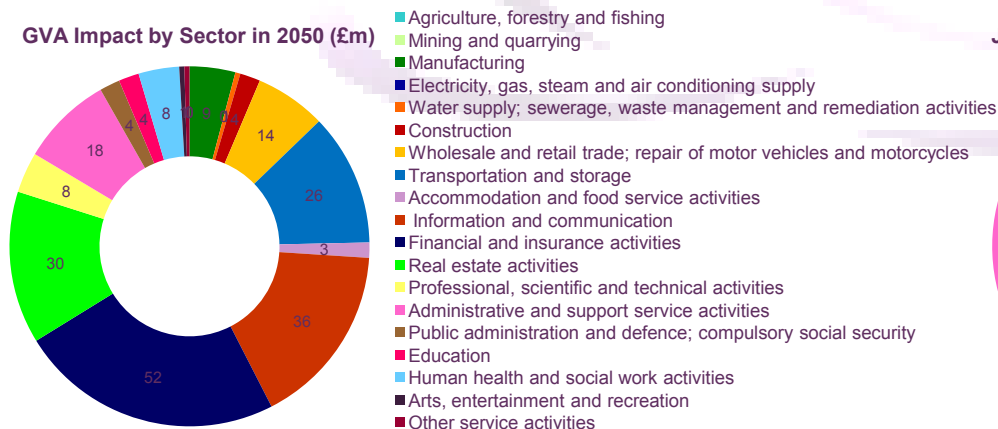
Impact in the Wider Economy – New Hub vs. Base Case

GVA Impact (£m)	£220 million
Employment Impact	2,180

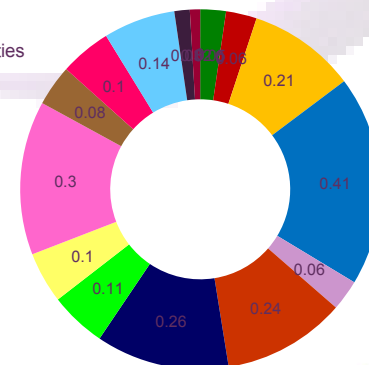
Key Messages

- The area's lack of connectivity now, both in terms of connections to London and the limited extent of its hub connections mean that the New Hub scenario, results in significant economic benefits to passengers.
- London bound passengers accrue around £22.8 million in economic benefits as a result of additional travellers being able to make journeys to London.
- Passengers hubbing in London accrue around £24.0 million in economic benefits primarily from increased numbers of daily flights to a hub and hence choice in potential hub services.
- In total, the New Hub scenario results in around £46.8 million in economic benefits to passengers and the airport compared to the Base Case or Heathrow Runway 3.
- The impact in the wider economy is also potentially significant with an increase in GVA of around £220 million and 2,180 jobs in 2050.
- Without expanding connections, there is some risk that Durham Tees Valley Airport could close if it remains loss making.

GVA Impact by Sector in 2050 (£m)



Jobs Impact by Sector in 2050 (000s)



Route Summary - Edinburgh

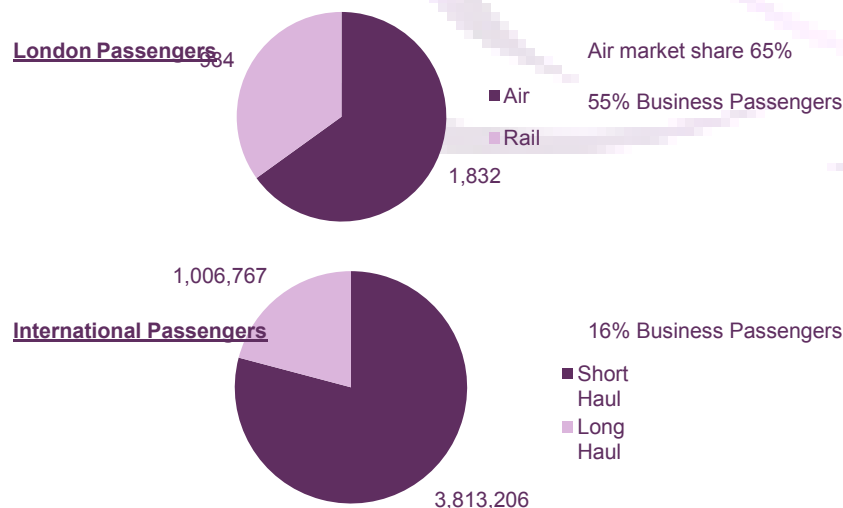
- Four Runway Hub offers nine more flights per day than the Base Case and five more than a Third Runway
- Four Runway Hub delivers £45 million per annum in direct benefits to users and the airport. £20 million more than a third runway
- It will deliver £451 million in GVA benefits and 2,590 jobs in the wider economy, concentrated in the Financial & Insurance Services sector

Nature & Quality of Current Connections

Status of Heathrow Connection	Current service. 17 flights per day
Air Travel Time to Central London	148 minutes
Other London Air Services	LCY, LGW, LTN, STN, SOU 22 per day
Other Hub Services (Flights per day)	Amsterdam (6), Brussels (2), Paris (4), Dublin (5), New York EWR (1), Frankfurt (2). Starting Soon - Philadelphia, Doha, Chicago
No. of Direct Rail Services & Travel Time to Central London	23 258 minutes

Impact of HS2 on Travel Times: 45 minute improvement
Air travel time to Central London includes an allowance for taxiing to the airport and transfer to the centre.

Core Catchment Demand in 2013 (000s)



- Edinburgh is a significant city in UK terms, the capital of Scotland and the centre of government. It is also the UK's second most important financial centre outside London.
- The Heathrow service is well established and offers rapid connectivity to London and to onward destinations. Journey times to London compare favourably with the train and consequently air market share is around 66%. HS2 is however likely to alter this balance slightly.
- Edinburgh is also well connected to the other London airports.
- International markets are significant and this helps to support a large number of connections to other hub airports, including to a number of long haul hubs.

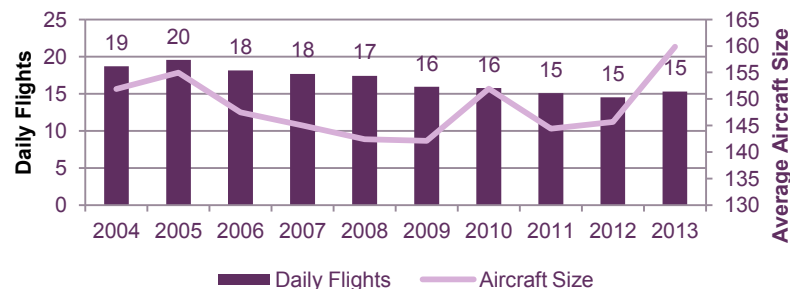
Key Economic & Demographic Information

	2014	2050	CAGR
GVA (£m, 2010 prices)	£17,551	£49,566	2.9%
GVA per capita	£35,600	£75,214	2.1%
Population	493,000	659,000	0.8%
Key Sectors	Financial Services, Professional Services		
Drivers of Growth	ICT, Admin. & Real Estate, Professional Services		
Visitors in 2012	2.4 million domestic, 1.3 million international		
Employment in Foreign Owned Companies	42,767		
FDI Jobs as a % of Total Employment in Nation / Region	0.2%		

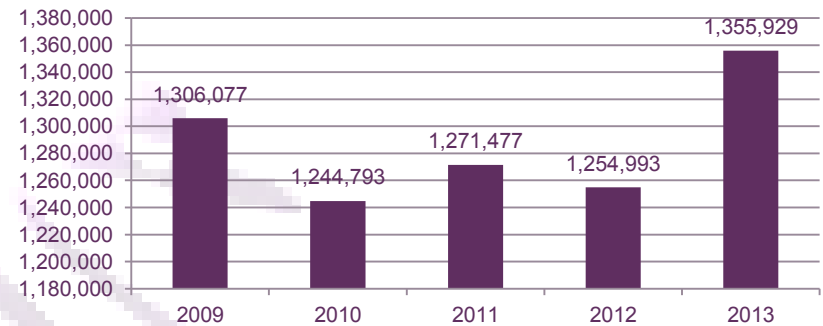
Route Summary - Edinburgh

- The Heathrow route is by far the largest individual route served by Edinburgh Airport, with around 1.3 million passengers in 2013.
- There has been some variation in passenger throughput in recent years but there has been a distinct uptick in 2013. This perhaps reflects Virgin Little Red's entry on the route, which may have stimulated new travel.
- Looking forward, we expect constraints in London, coupled with HS2, to impact heavily on the number of daily flights and seat capacity on the route. If no expansion takes place, daily frequency is expected to drop to around 9 and passenger throughput to around 1.1 million in the Base Case.
- Runway 3 would allow around 13 flights per day to remain and passenger throughput of around 1.6 million.
- A New Hub airport would see the number of daily flights at slightly above current levels but with larger aircraft. This reflects both some impact from HS2 on the point to point market but also an operational consideration that ultimately more daily flights would offer very little in terms of improved connectivity at the hub. It is therefore more efficient to increase aircraft size. The route would be handling around 2 million passengers in 2050.
- We do not believe that the growth of the service to a new hub would result in the withdrawal of any other hub services.

Heathrow Route Average Daily Flights and Aircraft Size



Heathrow Route Passengers 2009 to 2013



London Hub Route Forecast (000s)

	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	778	633	914	1,139
<i>Business</i>	403	331	478	586
<i>Leisure</i>	375	301	435	552
Hubbing in London	578	481	695	866
<i>Business</i>	159	356	514	641
<i>Leisure</i>	420	125	181	226
Total	1,356	1,114	1,609	2,005
<i>Business</i>	561	687	992	1,227
<i>Leisure</i>	795	427	616	778
Daily Flights	17	9	13	18
Aircraft Size	160	200	200	180

Route Summary - Edinburgh

Additional City Region Economic Impacts Compared to the Base Case in 2050

Economic Benefits to Passengers and Airports (£m)

	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£23.6	£42.9	£19.3
Travelling to London	£16.3	£28.7	£12.4
Business	£12.9	£22.3	£9.4
Leisure	£3.4	£6.4	£3.0
Hubbing in London	£7.3	£14.2	£6.9
Business	£5.1	£9.9	£4.8
Leisure	£2.2	£4.3	£2.1
Producer Benefits	£1.0	£1.8	£0.8
Total	£24.6	£44.7	£20.1

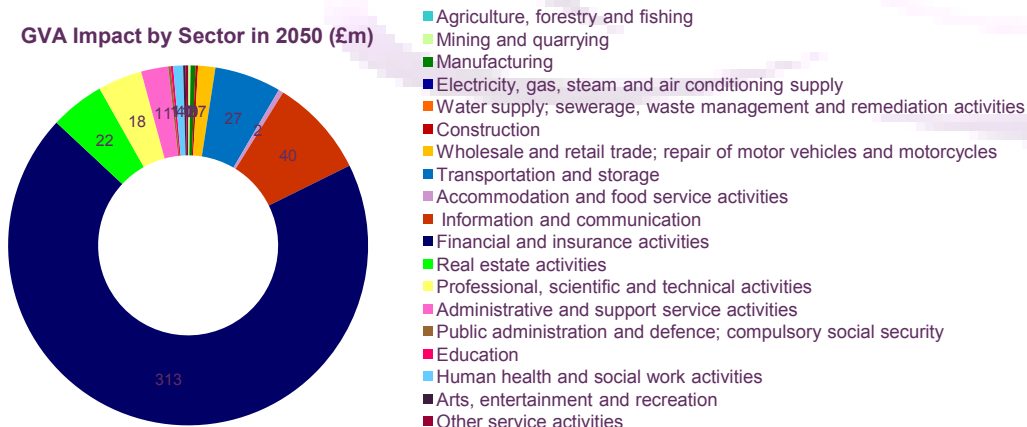
Impact in the Wider Economy – New Hub vs. Base Case

GVA Impact (£m)	£451
Employment Impact	2,590

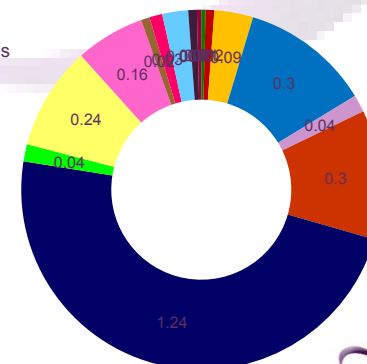
Key Messages

- The potential loss of significant numbers of London bound passengers in the event of a capacity constraint means that economic benefits to passengers stem primarily from this group. Passengers hubbing in London do receive benefits from the additional daily flights with Runway 3 or a New Hub but this effect is smaller given the extensive range of other hub connections.
- Runway 3 offers total economic benefits to passengers and the airport of around £24.6 million in 2050.
- The development of a New Hub would result in total economic benefits to passengers and the airport of around £44.7 million.
- The substantial impact on passenger traffic means that Edinburgh gains a significant boost in GVA and employment in the wider economy from the New Hub compared to the Base Case. In 2050, this impact is estimated to be around £451 million and 2,590 jobs.

GVA Impact by Sector in 2050 (£m)



Jobs Impact by Sector in 2050 (000s)



Route Summary - Glasgow

- Four Runway Hub offers seven more flights per day than the Base Case and four more than a Third Runway
- Four Runway Hub delivers £38 million per annum in direct benefits to users and the airport. £18 million more than a third runway
- It will deliver £358 million in GVA benefits and 2,620 jobs in the wider economy, concentrated in the Financial & Insurance Services sector

Nature & Quality of Current Connections

Status of Heathrow Connection	Current service. 9 flights per day
Air Travel Time to Central London	145 minutes
Other London Air Services	London City, Gatwick, Luton, Stansted 17
Other Hub Services (Flights per day)	Amsterdam (5), Dublin (5), Dubai (2), New York EWR (1)
No. of Direct Rail Services & Travel Time to Central London	21 270 minutes
Impact of HS2 on Travel Times	30 minute improvement

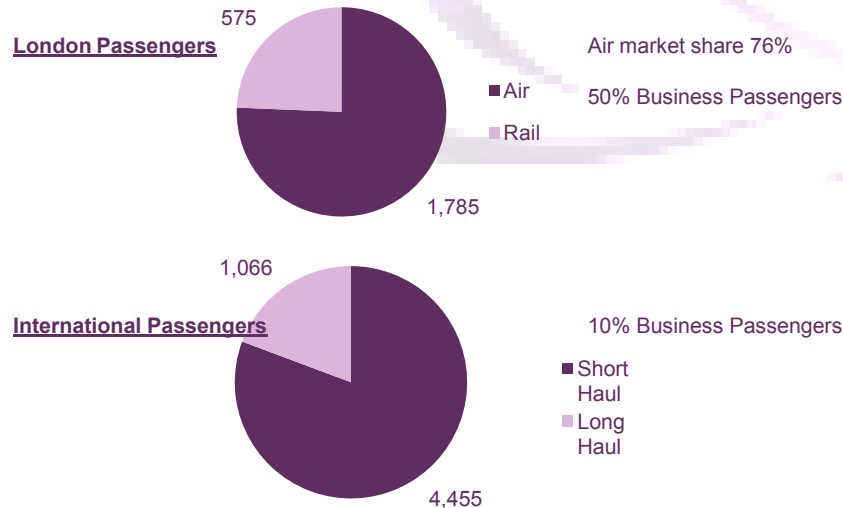
Air travel time to central London includes an allowance for transiting the airports and travel to the centre.

- Glasgow is a major economic centre in UK terms. It has a broad based economy but financial and business services are a particular feature.
- The Heathrow service is well established, providing rapid connectivity to London and onward. London's other airports are also well served.
- Rail journey times are significantly greater than air journey times and consequently air market share is relatively high. HS2 will, however, shift the balance somewhat.
- The core catchment also has a substantial base of demand for international services. The balance is, however, towards short haul destinations. As a result the airport already supports a range of existing hub services, including a twice daily Dubai

Key Economic & Demographic Information

	2014	2050	CAGR
GVA (£m, 2010 prices)	£18,283	£46,028	2.6%
GVA per capita	£30,574	£67,688	2.2%
Population	598,000	680,000	0.4%
Key Sectors	Financial Services, Admin & Real Estate		
Drivers of Growth	Professional Services, Admin & Real Estate, ICT		
Visitors in 2012	1.7 million domestic, 0.5 million international		
Employment in Foreign Owned Companies	66,310		
FDI Jobs as a % of Total Employment in Nation / Region	0.2%		

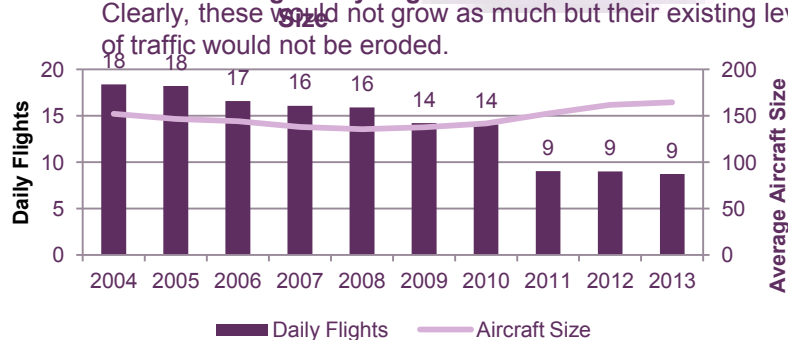
Core Catchment Demand in 2013 (000s)



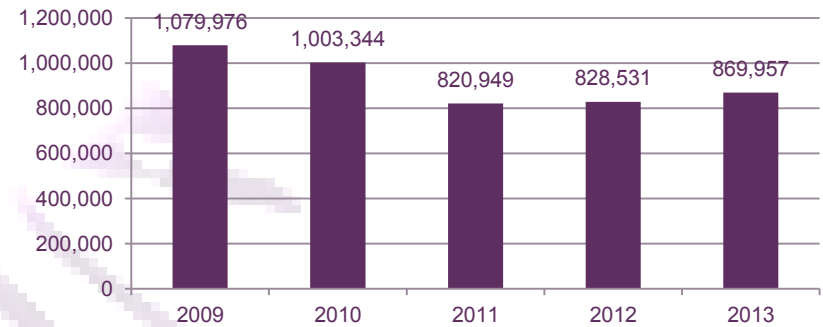
Route Summary - Glasgow

- The Heathrow route from Glasgow has suffered some erosion in recent years as bmi pulled off the route and BA have not fully filled the void. However, demand has been relatively steady over the last three years.
- In the future, we would anticipate the route being impacted by constraints in London. If no additional capacity is added we would expect some erosion of daily flights, partially offset by increases in aircraft size. In this case, we forecast passenger throughput of around 990,000 per annum in 2050 in the Base Case.
- The addition of a Runway 3 at Heathrow would provide some relief and would allow some growth in daily flights with demand. However, ultimately constraints at Heathrow by 2050 would still result in a reduced number of daily flights and increased aircraft size compared to the new hub. We forecast around 11 flights a day and passenger throughput of around 1.4 million on the route.
- The New Hub would allow unconstrained growth, resulting in a higher number of daily flights, a slightly smaller aircraft and greater passenger throughput. We would expect to see around 15 flights a day and passenger throughput of around 1.7 million.
- We do not believe that the growth of the service to a new hub would result in the withdrawal of any other hub services. Clearly, these would not grow as much but their existing level of traffic would not be eroded.

Heathrow Route Average Daily Flights and Aircraft Size



Heathrow Route Passengers 2009 to 2013



London Hub Route Forecast (000s)

	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	482	562	773	949
<i>Business</i>	228	294	404	494
<i>Leisure</i>	254	269	369	454
Hubbing in London	388	428	588	722
<i>Business</i>	98	330	453	556
<i>Leisure</i>	290	98	135	166
Total	870	990	1,361	1,671
<i>Business</i>	326	623	857	1,051
<i>Leisure</i>	544	367	504	620
Daily Flights	9	8	11	15
Aircraft Size	164	200	200	180

Route Summary - Glasgow

Additional City Region Economic Impacts Compared to the Base Case in 2050

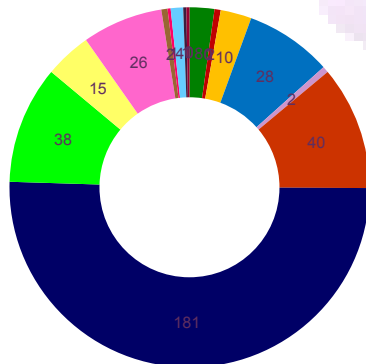
Economic Benefits to Passengers and Airports (£m)

	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£19.4	£37.0	£17.6
Travelling to London	£9.8	£17.8	£8.1
Business	£7.9	£14.4	£6.5
Leisure	£1.9	£3.5	£1.6
Hubbing in London	£9.6	£19.2	£9.6
Business	£6.5	£13.1	£6.5
Leisure	£3.1	£6.1	£3.0
Producer Benefits	£0.7	£1.3	£0.6
Total	£20.1	£38.3	£18.2

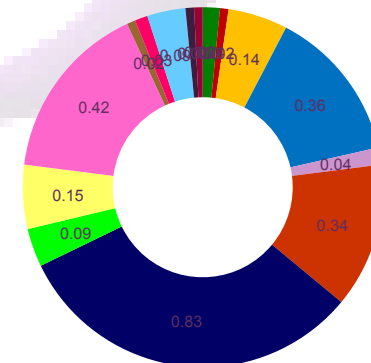
Impact in the Wider Economy – New Hub vs. Base Case

GVA Impact (£m)	£358
Employment Impact	2,620

GVA Impact by Sector in 2050 (£m)



Jobs Impact by Sector in 2050 (000s)



Key Messages

- Both Runway 3 and the New Hub offer economic benefits to passengers and the airport over the Base Case. These are relatively evenly balanced between London bound passengers and those hubbing in London.
- Benefits to London passengers come from the fact that more demand can be satisfied, while passengers hubbing in London benefit from the additional flights on what is Glasgow's main hub connection.
- Runway 3 offers annual economic benefits to passengers and the airport of around £20.1 million in 2050, while the New Hub would offer substantially higher benefits at around £38.3 million.
- The impact in the wider economy around Glasgow from the new hub would be substantial, with an increase of GVA in 2050 of around £358 million and 2,620 jobs. This would be focussed in the financial and insurance activities sectors particularly.

Route Summary – Humberside

- Four Runway Hub offers three more flights per day than the Base Case and also three more than a Third Runway
- Four Runway Hub delivers £14 million per annum in direct benefits to users and the airport. £14 million more than a third runway
- It will deliver £79 million in GVA benefits and 810 jobs in the wider economy, concentrated in the Transportation and Storage, ICT, Financial & Insurance and Manufacturing sectors

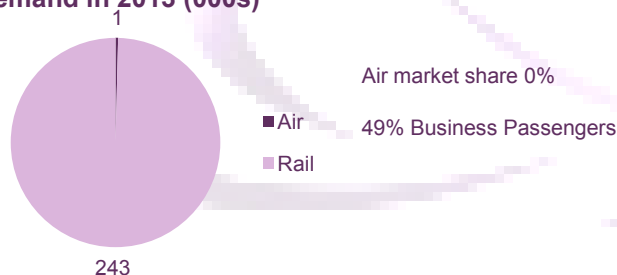
Nature & Quality of Current Connections

Status of Heathrow Connection	No service
Air Travel Time to Central London	121 minutes
Other London Air Services	None
Other Hub Services (Flights per day)	Amsterdam (3)
No. of Direct Rail Services & Travel Time to Central London	8 156 minutes
Impact of HS2 on Travel Times	None

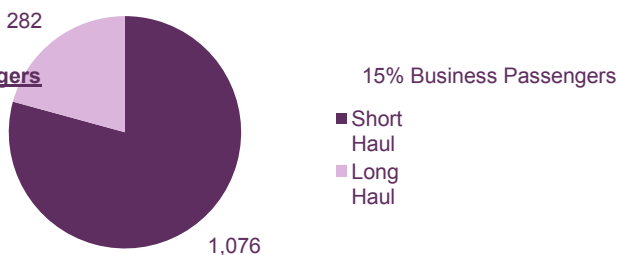
Air travel time to central London includes an allowance for transiting the airports and travel to the centre.

Core Catchment Demand in 2013 (000s)

London Passengers



International Passengers



- Humberside Airport is a key asset for the Humber Estuary industrial complex in the Yorkshire and the Humber region.
- There is no London air service currently and has not been for some time.
- While rail services are slower they compare favourably with air travel times and, consequently, it is unlikely that a service could easily make inroads in to the point to point market.
- The Amsterdam service is, however, well established and has been operating for many years. It provides good access to onward markets from this relatively uncompleted location.

Key Economic & Demographic Information

	2014	2050	CAGR
GVA (£m, 2010 prices)	£4,790	£9,896	2.1%
GVA per capita	£18,566	£38,357	2.0%
Population	258,000	258,000	0.0%
Key Sectors	Primary & Secondary, Public Services		
Drivers of Growth	ICT, Admin & Real Estate, Professional Services		
Visitors in 2012	1.7 million domestic, 0.1 million international		
Employment in Foreign Owned Companies	10,098		
FDI Jobs as a % of Total Employment in Nation / Region	0.2%		

Route Summary – Humberside

- In common with a number of the markets closer to London, it is difficult to see a Humberside service making significant inroads in to the point to point market such that it might support large volumes and, consequently, large aircraft at a high enough frequency to enable effective hub operations. Therefore, services are likely to focus on onward traffic and operate with small aircraft. These are unlikely to survive in a constrained hub environment.
- However, our analysis suggests that a three a day frequency with a 100 seat aircraft could be viable only with a New Hub. We estimate that such a service might carry around 186,000 passengers in 2050.
- This would not erode the existing level of traffic on the Amsterdam service, but it would clearly result in some growth in demand shifting to the new service.

London Hub Route Forecast (000s)

	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	0	0	0	50
<i>Business</i>	0	0	0	24
<i>Leisure</i>	0	0	0	27
Hubbing in London	0	0	0	135
<i>Business</i>	0	0	0	92
<i>Leisure</i>	0	0	0	43
Total	0	0	0	186
<i>Business</i>	0	0	0	116
<i>Leisure</i>	0	0	0	70
Daily Flights	0	0	0	3
Aircraft Size	-	-	-	100

Route Summary – Humberside

Additional City Region Economic Impacts Compared to the Base Case in 2050

Economic Benefits to Passengers and Airports (£m)

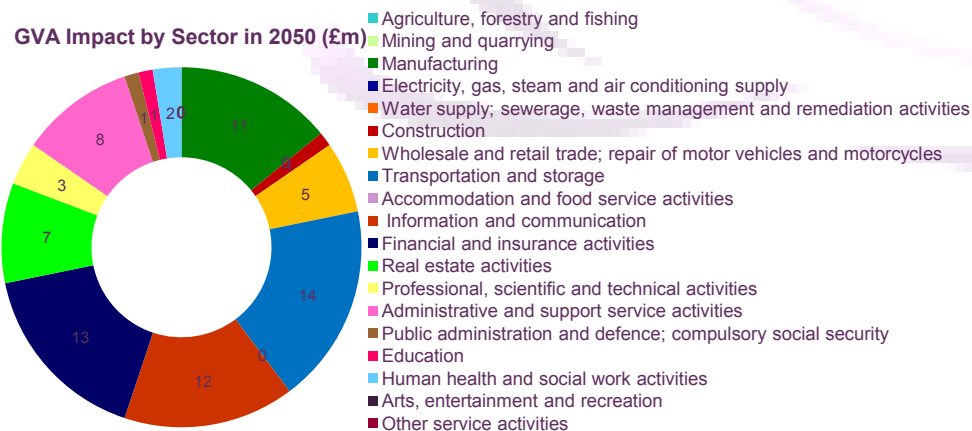
	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£0.0	£13.8	£13.8
Travelling to London	£0.0	£0.7	£0.7
Business	£0.0	£0.6	£0.6
Leisure	£0.0	£0.1	£0.1
Hubbing in London	£0.0	£13.1	£13.1
Business	£0.0	£8.0	£8.0
Leisure	£0.0	£5.1	£5.1
Producer Benefits	£0.0	£0.0	£0.0
Total	£0.0	£13.8	£13.8

Impact in the Wider Economy – New Hub vs. Base Case

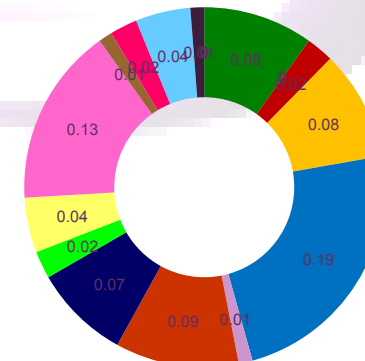
GVA Impact (£m)	£79
Employment Impact	810

Key Messages

- The relative limited nature of the current hub connections mean that the addition of the new hub service results in more choice and more daily flights for passengers.
- The result is economic benefits to passengers of around £13.8 million per annum in 2050.
- A New Hub will deliver £79 million in GVA benefits and 810 jobs in the wider economy, concentrated in the Transportation and Storage, ICT, Financial & Insurance and Manufacturing sectors.



Jobs Impact by Sector in 2050 (000s)



Route Summary – Inverness

- Four Runway Hub offers four more flights per day than the Base Case and also four more than a Third Runway
- Four Runway Hub delivers £33 million per annum in direct benefits to users and the airport. £33 million more than a third runway
- It will deliver £66 million in GVA benefits and 850 jobs in the wider economy, principally in the Transport and Storage, ICT and Financial & Insurance Services sectors

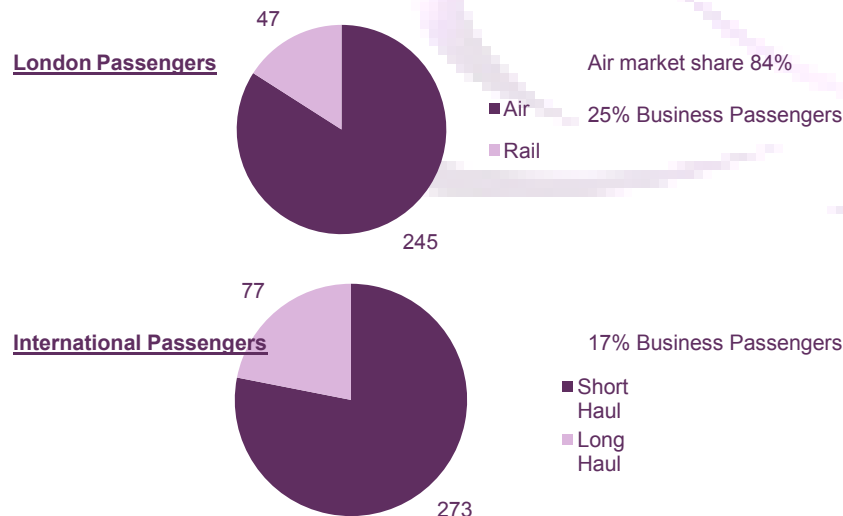
Nature & Quality of Current Connections

Status of Heathrow Connection	No Service
Air Travel Time to Central London	170 minutes
Other London Air Services	Gatwick and Luton 3 per day
Other Hub Services (Flights per day)	Amsterdam (1)
No. of Direct Rail Services & Travel Time to Central London	2 475 minutes

- Inverness is the largest city and the administrative centre for the Highlands of Scotland.
- While it has had a Heathrow connection in the past, there is no current link. Air connectivity to London is provided by easyJet services to Gatwick and Luton.
- Air journey times are substantially faster than rail, which results in a strong air market share. HS2 will shift the balance slightly but the effect is likely to be limited.
- Existing hub links are limited to a once a day service to Amsterdam operated by Flybe but with a codeshare arrangement with KLM.

Impact of HS2 on Travel Times: 45 minute improvement
Air travel time to central London includes an allowance for transiting the airports and travel to the centre.

Core Catchment Demand in 2013 (000s)



Key Economic & Demographic Information

	2014	2050	CAGR
GVA (£m, 2010 prices)	£3,535	£7,852	2.2%
GVA per capita	£15,107	£29,519	1.9%
Population	234,000	266,000	0.4%
Key Sectors	Primary & Secondary, Trade & Hospitality, Public Services		
Drivers of Growth	ICT, Professional Services, Admin & Real Estate		
Visitors in 2012	1.9 million domestic, 0.3 million international		
Employment in Foreign Owned Companies	2,558		
FDI Jobs as a % of Total Employment in Nation / Region	0.2%		

Route Summary – Inverness

- We do not believe that an Inverness service will be operating to Heathrow in 2050 in either the Base Case or even with a third runway.
- The constraint dynamic in both cases by 2050 will be such that the small aircraft needed to operate services from relatively small markets such as those around Inverness will be priced out in favour of more revenue intensive uses for the slot.
- However, with a four runway hub, these slot constraints will not exist and we forecast that a four times daily service using a 100 seat aircraft would be a viable proposition. This would compete with the already strong low fares offer to London. The service would be slightly balanced towards London bound travellers, but there would also be a significant market for passengers wanting to hub in London. By 2050, we would anticipate this service handling around 250,000 passengers per annum.
- We do not believe that the growth of the service to a new hub would result in the withdrawal of any other hub services. Clearly, these would not grow as much but their existing level of traffic would not be eroded.

London Hub Route Forecast (000s)

	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	0	0	0	141
<i>Business</i>	0	0	0	30
<i>Leisure</i>	0	0	0	111
Hubbing in London	0	0	0	107
<i>Business</i>	0	0	0	79
<i>Leisure</i>	0	0	0	28
Total	0	0	0	248
<i>Business</i>	0	0	0	109
<i>Leisure</i>	0	0	0	139
Daily Flights	0	0	0	4
Aircraft Size	-	100	100	100

Route Summary – Inverness

Additional City Region Economic Impacts Compared to the Base Case in 2050

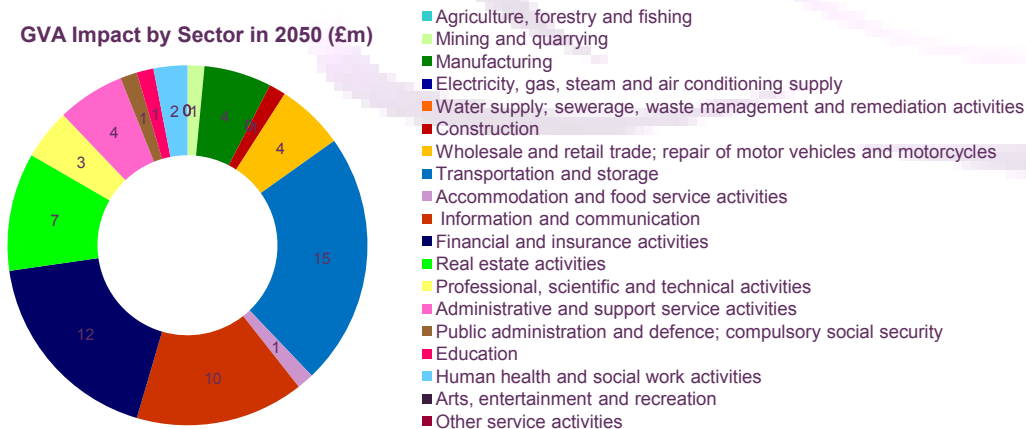
Economic Benefits to Passengers and Airports (£m)

	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£0.0	£32.4	£32.4
Travelling to London	£0.0	£10.9	£10.9
Business	£0.0	£5.8	£5.8
Leisure	£0.0	£5.0	£5.0
Hubbing in London	£0.0	£21.5	£21.5
Business	£0.0	£10.3	£10.3
Leisure	£0.0	£11.2	£11.2
Producer Benefits	£0.0	£0.6	£0.6
Total	£0.0	£32.9	£32.9

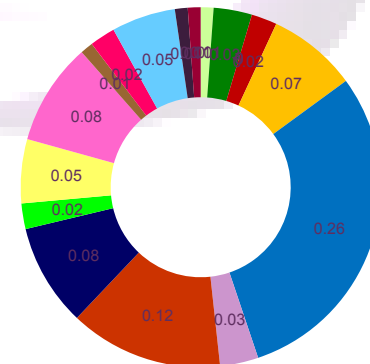
Impact in the Wider Economy – New Hub vs. Base Case

GVA Impact (£m)	£66
Employment Impact	850

GVA Impact by Sector in 2050 (£m)



Jobs Impact by Sector in 2050 (000s)



Key Messages

- Given the isolated geographic position of Inverness and the limited alternatives in terms of existing hub services, it is not surprising that the route offers significant economic benefits to both London bound passengers and those seeking to travel onwards from the hub in the New Hub scenario.
- By 2050, we estimate that total economic benefits to passengers and the airport of around £32.9 million per annum will be delivered in and around Inverness.
- In terms of the impact in the wider economy, the additional business travel generated by the route would support around £64 million of GVA and 850 jobs, principally in the Transport and Storage, ICT and Financial & Insurance Services sectors.

Route Summary – Leeds Bradford

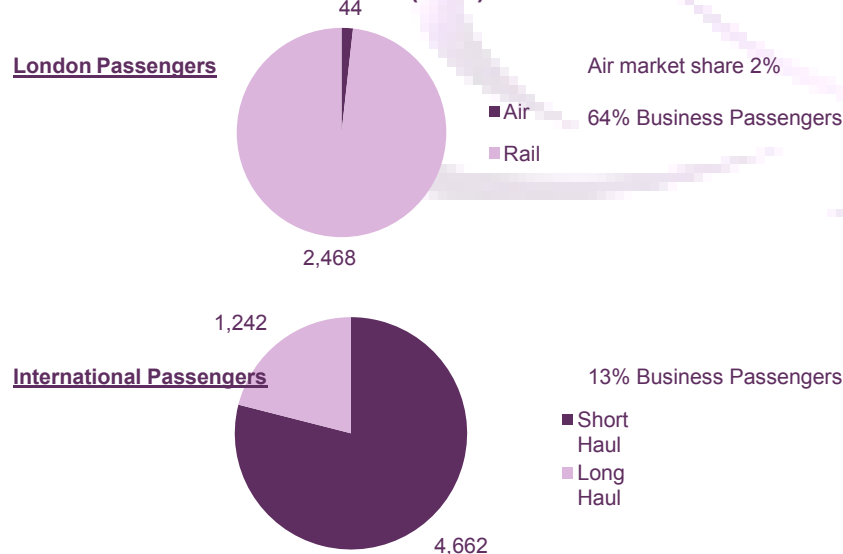
- Four Runway Hub offers three more flights per day than the Base Case and also three more than a Third Runway
- Four Runway Hub delivers £37 million per annum in direct benefits to users and the airport. £37 million more than a third runway
- It will deliver £103 million in GVA benefits and 780 jobs in the wider economy, concentrated in the Financial & Insurance Services sector

Nature & Quality of Current Connections

Status of Heathrow Connection	Current service. 3 flights per day
Air Travel Time to Central London	130
Other London Air Services	None
Other Hub Services (Flights per day)	Amsterdam (4)
No. of Direct Rail Services & Travel Time to Central London	32 119
Impact of HS2 on Travel Times	60 minute improvement

Air travel time to central London includes an allowance for transiting the airports and travel to the centre.

Core Catchment Demand in 2013 (000s)



- The Leeds Bradford conurbation is the largest city region in Yorkshire & Humber and is a significant economic driver. It has a broad based economy but financial and professional services are a particular strength.
- The Heathrow service has recently been reinstated by BA following its closure in 2009 by bmi. It is currently the only air service to London from the airport.
- Flight times to London compare poorly with rail and consequently air market share is very low. HS2 will further intensify rail's advantage, undermining the point to point market on the route.
- International markets from the core catchment are of a reasonable size and there are significant number of long haul passengers. This is reflected in the existence of the four a day service to Amsterdam and Manchester Airport is also a significant competitor.

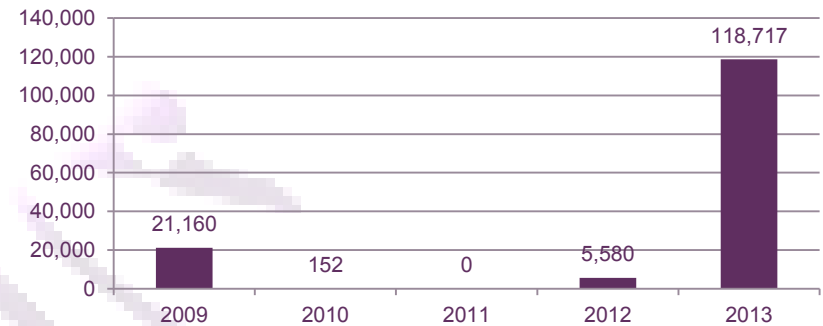
Key Economic & Demographic Information

	2014	2050	CAGR
GVA (£m, 2010 prices)	£19,314	£47,122	2.5%
GVA per capita	£25,148	£52,533	2.1%
Population	768,000	897,000	0.4%
Key Sectors	Professional Services, Admin & Real Estate, Financial Services		
Drivers of Growth	ICT, Professional Services, Admin & Real Estate		
Visitors in 2012	2.7 million domestic, 0.5 million international		
Employment in Foreign Owned Companies	303,415		
FDI Jobs as a % of Total Employment in Nation / Region	0.2%		

Route Summary – Leeds Bradford

- The Heathrow service restarted in 2013 and handled around 120,000 passengers. It ceased previously in early 2009.
- Looking to the future, we do not believe that the Leeds Bradford service will survive in either the Base Case or Runway 3. The impact of HS2 on the remains of the London bound market combined with slot pressures pushing up the minimum size for aircraft operating to Heathrow will mean that it will be dropped in favour of a more revenue intensive use for the slot.
- With the New Hub, we believe that it will survive or be reconnected, albeit with a relatively low number of flights per day and with a small aircraft. There is sufficient value in the hubbing markets for an airline to sensibly operate the route with the right size of aircraft.
- We would envisage the service operating three times per day using a 100 seat aircraft. The route would handle around 186,000 passengers per annum balanced heavily towards onward connecting traffic.
- We do not believe that the growth of the service to a New Hub would result in the withdrawal of any other hub services. Clearly, these would not grow as much but their existing level of traffic would not be eroded.

Heathrow Route Passengers 2009 to 2013



London Hub Route Forecast (000s)

	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	39	0	0	56
<i>Business</i>	29	0	0	36
<i>Leisure</i>	10	0	0	20
Hubbing in London	80	0	0	130
<i>Business</i>	29	0	0	87
<i>Leisure</i>	51	0	0	43
Total	119	0	0	186
<i>Business</i>	58	0	0	122
<i>Leisure</i>	61	0	0	63
Daily Flights	3	0	0	3
Aircraft Size	116	100	100	100

Route Summary – Leeds Bradford

Additional City Region Economic Impacts Compared to the Base Case in 2050

Economic Benefits to Passengers and Airports (£m)

	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£0.0	£37.1	£37.1
Travelling to London	£0.0	£1.0	£1.0
Business	£0.0	£0.9	£0.9
Leisure	£0.0	£0.1	£0.1
Hubbing in London	£0.0	£36.1	£36.1
Business	£0.0	£20.2	£20.2
Leisure	£0.0	£15.9	£15.9
Producer Benefits	£0.0	£0.0	£0.0
Total	£0.0	£37.1	£37.1

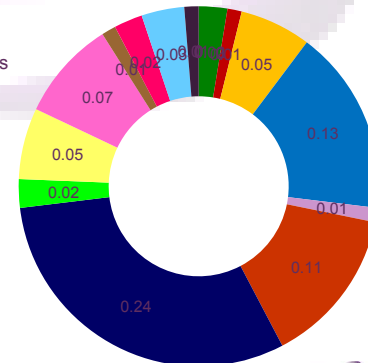
Impact in the Wider Economy – New Hub vs. Base Case

GVA Impact (£m)	£103
Employment Impact	780

GVA Impact by Sector in 2050 (£m)



Jobs Impact by Sector in 2050 (000s)



Key Messages

- The New Hub therefore offers significant economic benefits to passengers, primarily to those hubbing in London. Leeds Bradford has relatively few hub connections and consequently a service to the new hub is likely to represent a considerable improvement in choice.
- Some benefits also accrue to London bound passengers as those using the air service will clearly do so because it is of benefit to them. In the absence of the service they will either be priced out of the market or will be forced to use another mode which is not as convenient for their specific journey.
- In total, we estimate that the economic benefits to passengers and the airport from the New Hub for Leeds Bradford are around £37.1 million per annum in 2050.
- In terms of the impact on the wider economy, the additional business travel enabled by the service to the new hub will support around £103 million of GVA and 780 jobs in 2050. The impact will be particularly strong on the Financial Services and Insurance sector.

Route Summary – Liverpool

- Four Runway Hub offers five more flights per day than the Base Case and also five more than a Third Runway
- Four Runway Hub delivers £67 million per annum in direct benefits to users and the airport. £67 million more than a third runway
- It will deliver £120 million in GVA benefits and 980 jobs in the wider economy, mainly in the Financial & Insurance Services and ICT sectors

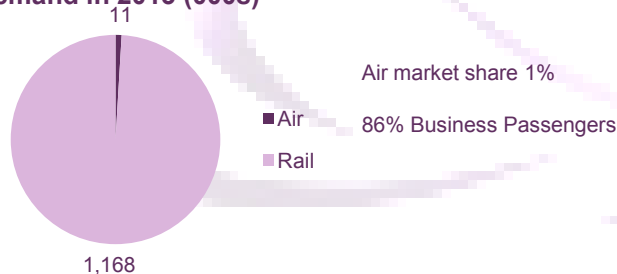
Nature & Quality of Current Connections

Status of Heathrow Connection	Lost in 1992
Air Travel Time to Central London	126 minutes
Other London Air Services	None
Other Hub Services (Flights per day)	None
No. of Direct Rail Services & Travel Time to Central London	17 124 minutes

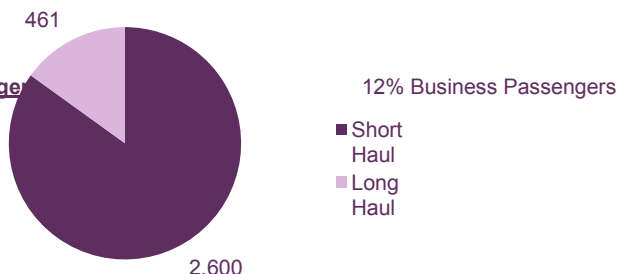
Impact of HS2 on Travel Times 30 minute improvement
Air travel time to central London includes an allowance for transiting the airports and travel to the centre.

Core Catchment Demand in 2013 (000s)

London Passengers



International Passengers



- Liverpool is one of the UK's largest city regions and a substantial economic driver in the North West economy.
- It does not have any Heathrow currently and has not had one since 1992. It also does not have any other air services to London. It is, however, well connected by train, with a highly competitive journey time. For travel to and from London, rail is therefore almost totally dominant (a small number of passengers use Manchester Airport). HS2 will reinforce this dominance.
- Short haul international markets in the core catchment are large but long haul markets are, in comparison, relatively small. This has hindered the airport's ability to develop a hub service, particularly in competition with Manchester Airport.

Key Economic & Demographic Information

	2014	2050	CAGR
GVA (£m, 2010 prices)	£10,058	£23,802	2.4%
GVA per capita	£21,264	£48,280	2.3%
Population	473,000	493,000	0.1%
Key Sectors	Public Services, ICT, Admin & Real Estate		
Drivers of Growth	Professional Services, ICT, Admin & Real Estate		
Visitors in 2012	1.9 million domestic, 0.6 million international		
Employment in Foreign Owned Companies	44,284		
FDI Jobs as a % of Total Employment in Nation / Region	0.3%		

Route Summary – Liverpool

- Given the dominance of rail in the point to point market and the consequent need for a hub service to focus primarily on onward connecting traffic, we do not believe that a Heathrow service will operate from Liverpool in either the Base Case or the Runway 3 case. The need for high numbers of daily flights drives relatively small aircraft sizes in this market and we do not believe such aircraft will be able to operate from a constrained hub.
- However, with the New Hub, which is unconstrained, smaller aircraft will not be priced out in the same way. Consequently, it would be possible to operate a five times daily service to the New Hub using a 100 seat aircraft. This would handle around 310,000 passengers per annum in 2050, with a strong balance towards onward connecting passengers.

London Hub Route Forecast (000s)

	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	0	0	0	93
<i>Business</i>	0	0	0	80
<i>Leisure</i>	0	0	0	13
Hubbing in London	0	0	0	216
<i>Business</i>	0	0	0	126
<i>Leisure</i>	0	0	0	90
Total	0	0	0	309
<i>Business</i>	0	0	0	206
<i>Leisure</i>	0	0	0	103
Daily Flights	0	0	0	5
Aircraft Size	-	-	-	100

Route Summary – Liverpool

Additional City Region Economic Impacts Compared to the Base Case in 2050

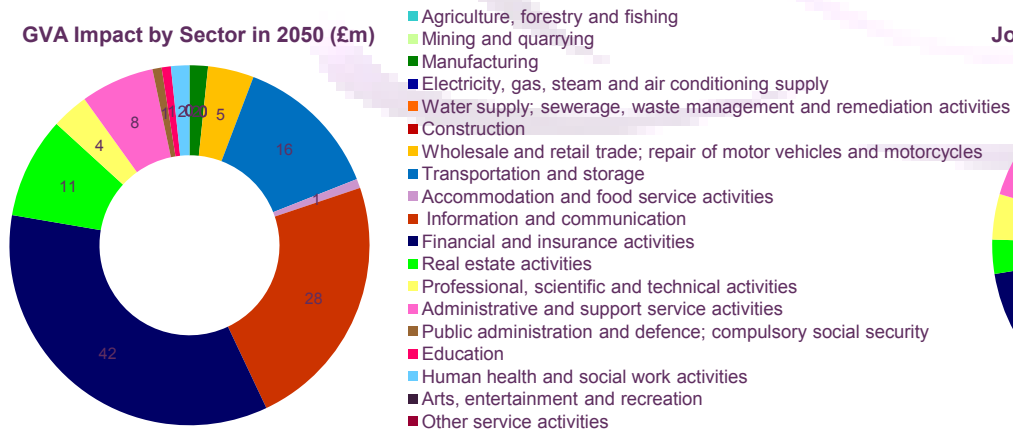
Economic Benefits to Passengers and Airports (£m)

	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£0.0	£66.3	£66.3
Travelling to London	£0.0	£3.7	£3.7
Business	£0.0	£3.6	£3.6
Leisure	£0.0	£0.1	£0.1
Hubbing in London	£0.0	£62.6	£62.6
Business	£0.0	£31.0	£31.0
Leisure	£0.0	£31.6	£31.6
Producer Benefits	£0.0	£0.7	£0.7
Total	£0.0	£67.0	£67.0

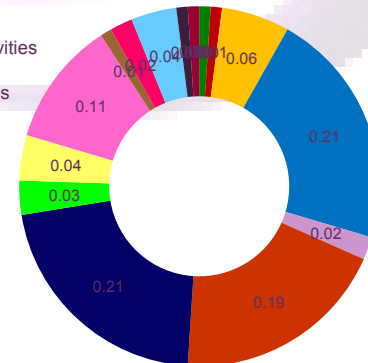
Impact in the Wider Economy – New Hub vs. Base Case

GVA Impact (£m)	£120
Employment Impact	980

GVA Impact by Sector in 2050 (£m)



Jobs Impact by Sector in 2050 (000s)



Key Messages

- The lack of hub connectivity from Liverpool means that there are significant economic benefits to passengers to be gained from a New Hub.
- These are driven primarily by passengers hubbing in London that are able to access a hub service from Liverpool rather than having to travel to Manchester.
- There are also a number of London bound travellers that make additional trips on the service, resulting in economic benefits to these passengers.
- In total, the New Hub scenario results in economic benefits to passengers and the airport of around £67.0 million in Liverpool in 2050.
- The potential impact on the wider economy is also significant. The additional business travel enabled by the new service results in a GVA impact of around £120 million and 980 additional jobs in 2050.

Route Summary - Manchester

- Four Runway Hub offers two more flights per day than the Base Case and one more than a Third Runway
- Four Runway Hub delivers £5 million per annum in direct benefits to users and the airport. £3 million more than a third runway
- It will deliver £66 million in GVA benefits and 460 jobs in the wider economy, concentrated in the Financial & Insurance Services sector

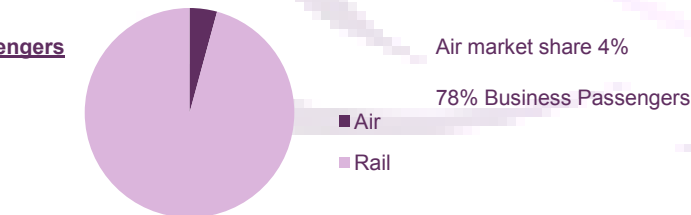
Nature & Quality of Current Connections

Status of Heathrow Connection	Current service. 12 flights per day
Air Travel Time to Central London	125 minutes
Other London Air Services	None
Other Hub Services (Flights per day)	Amsterdam (6), Atlanta (1), Abu Dhabi (2), Brussels (3), Paris (7), Doha (1), Dublin (5), Dubai (3), New York EWR (1), New York JFK (1), Frankfurt (4), Munich (3), Chicago (1), Singapore (1), Zurich (3). Coming Soon - Hong Kong
No. of Direct Rail Services & Travel Time to Central London	48 120 minutes

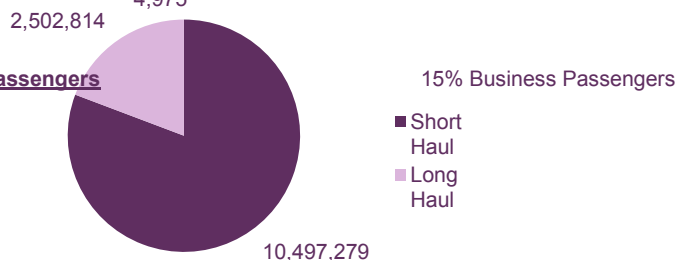
Air travel time to central London includes an allowance for transiting the airports and travel to the centre.

Core Catchment Demand in 2013 (000s)
Impact of HS2 on travel times 220 160 minute improvement

London Passengers



International Passengers



- Manchester is one of the largest city region economies in the UK and is at the heart of the largest air transport market outside of London.
- The point to point market to London is heavily competed by the train and air market share is very low. The upgrading of the West Coast Main Line resulted in a step change in rail connectivity and air services have declined since. Only Heathrow is now served, with BA and Virgin primarily seeking to serve the onward connecting market. HS2 will have a significant impact here and is likely to further erode the point to point market.
- International markets, including long haul, are large and this is reflected in the wide range of hubs offered from Manchester, including a significant number of long haul hubs.

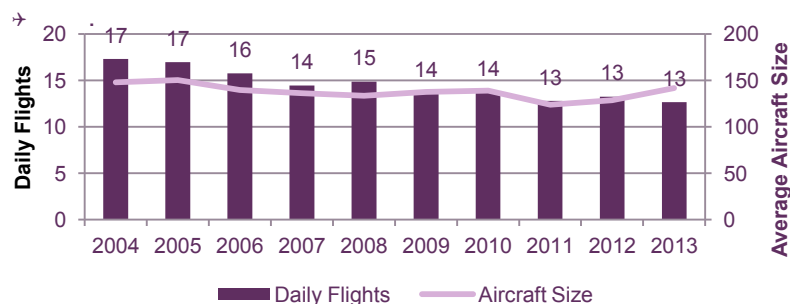
Key Economic & Demographic Information

	2014	2050	CAGR
GVA (£m, 2010 prices)	£14,924	£39,518	2.5%
GVA per capita	£28,535	£61,459	2.2%
Population	523,000	643,000	0.6%
Key Sectors	Professional Services, Financial Services, Transportation and Storage		
Drivers of Growth	ICT, Professional Services, Admin. & Real Estate		
Visitors in 2012	3.5 million domestic, 1.1 million international		
Employment in Foreign Owned Companies	133,033		
FDI Jobs as a % of Total Employment in Nation / Region	0.3%		

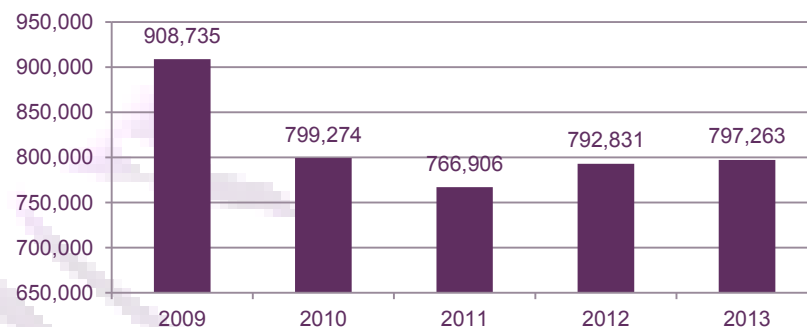
Route Summary - Manchester

- The combined impact of rail improvements and the recession can be seen in the passenger numbers on the Heathrow route.
- Demand has declined significantly since 2009 and while there has been some recovery since the recession, levels remain significantly below historic passenger throughput. This has been reflected in a loss of frequency over time.
- Looking forward, all scenarios see a decline in daily flights over time but this is offset by the use of larger aircraft. This reflects particularly the continued erosion of the point to point market by rail with HS2 coming on stream.
- No expansion in London sees the number of daily flights fall to 8 per day and passenger throughput at around 990,000 in the Base Case.
- Development of Runway 3 saves one additional frequency and results in throughput of around 1.1 million.
- The development of a New Hub results in a service with the same number of passengers, 1.1 million, but with an additional daily flight supported using a slightly smaller aircraft. This ultimately provides greater flexibility and some connectivity benefits for passengers.
- We do not believe that the growth of the service to a new hub would result in the withdrawal of any other hub services. Clearly, these would not grow as much but their existing level of traffic would not be eroded.

Heathrow Route Average Daily Flights and Aircraft Size



Heathrow Route Passengers 2009 to 2013



London Hub Route Forecast (000s)

	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	240	298	336	336
<i>Business</i>	174	231	260	260
<i>Leisure</i>	66	67	76	76
Hubbing in London	557	692	778	778
<i>Business</i>	213	397	447	447
<i>Leisure</i>	345	295	332	332
Total	797	990	1,114	1,114
<i>Business</i>	386	628	707	707
<i>Leisure</i>	411	362	407	407
Daily Flights	12	8	9	10
Aircraft Size	142	200	200	180

Route Summary - Manchester

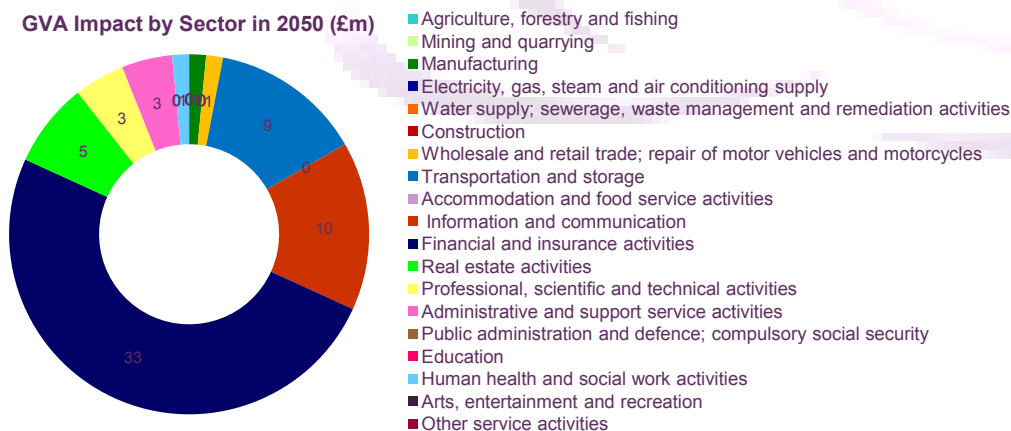
Additional City Region Economic Impacts Compared to the Base Case in 2050

Economic Benefits to Passengers and Airports (£m)			
	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£2.7	£5.1	£2.5
Travelling to London	£0.2	£0.3	£0.1
Business	£0.2	£0.3	£0.1
Leisure	£0.0	£0.0	£0.0
Hubbing in London	£2.5	£4.8	£2.3
Business	£1.8	£3.5	£1.7
Leisure	£0.7	£1.3	£0.6
Producer Benefits	£0.0	£0.0	£0.0
Total	£2.7	£5.2	£2.5
Impact in the Wider Economy – New Hub vs. Base Case			
GVA Impact (£m)			£66
Employment Impact			460

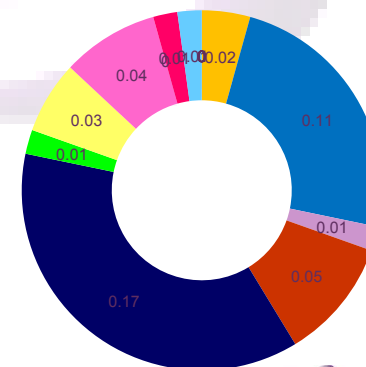
Key Messages

- Benefits to the Manchester City Region are relatively limited. This stems from its proximity to London and the consequent fact that rail offers a significantly better alternative for travel to London for most passengers, particularly with HS2, plus the fact that Manchester is a major airport in its own right, offering a significant number of hub services and good range of direct services.
- There are some benefits to passengers to the area, but these are limited to around £2.7 million in 2050 with the addition of Runway 3 and £5.2 million with the addition of a New Hub. These stem mainly from increased numbers of daily flights and the ability of some London travellers to make journeys they previously would not have done.
- Despite the relatively limited impact on traffic compared to the Base Case, the new hub would still be expected to deliver around £66 million in GVA impacts and 460 jobs in the wider economy. Financial & Insurance Activities benefit particularly from the increased connectivity.

GVA Impact by Sector in 2050 (£m)



Jobs Impact by Sector in 2050 (000s)



Route Summary - Newcastle

- Four Runway Hub offers one more flight per day than the Base Case and also one more than a Third Runway
- Four Runway Hub delivers £2 million per annum in direct benefits to users and the airport. £2 million more than a third runway
- It will deliver £64 million in GVA benefits and 530 jobs in the wider economy, mainly in the Financial & Insurance Services and ICT sectors

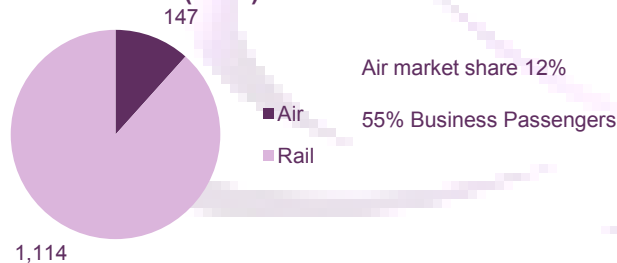
Nature & Quality of Current Connections

Status of Heathrow Connection	Current service. 6 flights per day
Air Travel Time to Central London	140 minutes
Other London Air Services	Gatwick, 2 per day
Other Hub Services (Flights per day)	Amsterdam (5), Brussels (2), Paris (2), Dublin (2), Dubai (1)
No. of Direct Rail Services & Travel Time to Central London	31 156 minutes

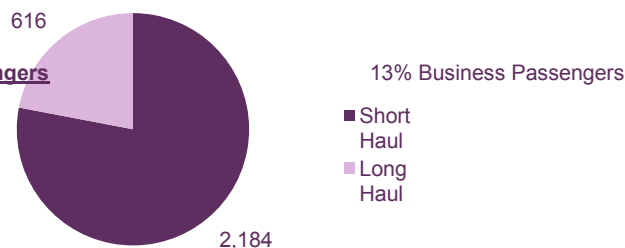
Impact of HS2 on Travel Times 34 minute improvement
Air travel time to central London includes an allowance for transiting the airports and travel to the centre.

Core Catchment Demand in 2013 (000s)

London Passengers



International Passengers



- Newcastle is the largest city economy in the North East of England. The Heathrow service is long established and offers a competitive journey time to central London compared to rail. Ultimately, however, rail offers greater frequency of service and convenience and consequently air market share is small. HS2 will tip the balance further towards rail.
- International markets in the core catchment area are of a reasonable scale but more importantly they are relatively uncompleted. Newcastle is isolated from most of the other centres in the North of England.
- This has meant that the Airport has developed a good range of connectivity to existing hub airports, including a daily service to the Dubai long haul hub.

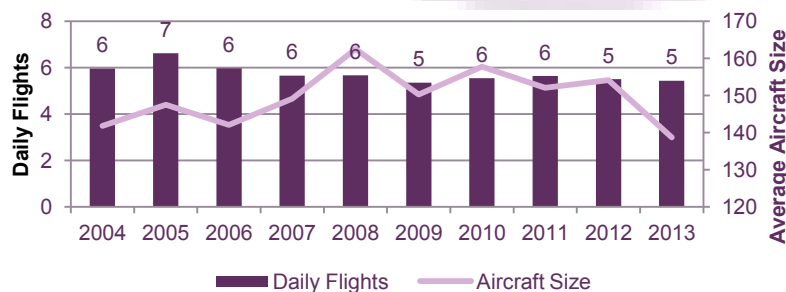
Key Economic & Demographic Information

	2014	2050	CAGR
GVA (£m, 2010 prices)	£7,341	£16,881	2.4%
GVA per capita	£25,758	£53,590	2.1%
Population	285,000	315,000	0.3%
Key Sectors	Public Services, Admin & Real Estate		
Drivers of Growth	ICT, Professional Services, Admin & Real Estate		
Visitors in 2012	1.6 million domestic, 0.4 million international		
Employment in Foreign Owned Companies	28,975		
FDI Jobs as a % of Total Employment in Nation / Region	0.5%		

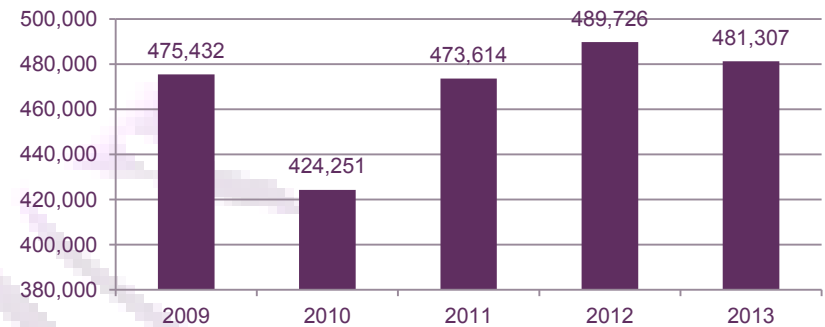
Route Summary - Newcastle

- The Heathrow service has in the main performed steadily in recent years, with the exception of 2010, which is likely to be a recessionary impact. Otherwise, there has is a slight upward trend over time.
- Looking forward, we anticipate limited change in the number of flights per day in all scenarios. This ultimately results from the erosion of the point to point market by improved rail connections across all cases.
- Constraints at Heathrow see frequency fall to 5 a day in both the Base and Runway 3 scenarios, with passenger throughput in both at around 560,000 per annum in 2050.
- The New Hub enables an additional daily flight to be added, increasing slightly the London bound traffic and more significantly the passengers hubbing in London. Passenger throughput in 2050 is forecast to be around 670,000 per annum.
- We do not believe that the growth of the service to a new hub would result in the withdrawal of any other hub services. Clearly, these would not grow as much but their existing level of traffic would not be eroded.

Heathrow Route Average Daily Flights and Aircraft Size



Heathrow Route Passengers 2009 to 2013



London Hub Route Forecast (000s)

	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	130	151	151	181
<i>Business</i>	66	83	83	99
<i>Leisure</i>	64	68	68	82
Hubbing in London	351	406	406	487
<i>Business</i>	88	305	305	366
<i>Leisure</i>	263	101	101	121
Total	481	557	557	668
<i>Business</i>	155	388	388	465
<i>Leisure</i>	327	169	169	204
Daily Flights	5	5	5	6
Aircraft Size	139	180	180	180

Route Summary - Newcastle

Additional City Region Economic Impacts Compared to the Base Case in 2050

Economic Benefits to Passengers and Airports (£m)

	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£0.0	£2.1	£2.1
Travelling to London	£0.0	£0.1	£0.1
Business	£0.0	£0.1	£0.1
Leisure	£0.0	£0.0	£0.0
Hubbing in London	£0.0	£2.0	£2.0
Business	£0.0	£1.4	£1.4
Leisure	£0.0	£0.6	£0.6
Producer Benefits	£0.0	£0.0	£0.0
Total	£0.0	£2.1	£2.1

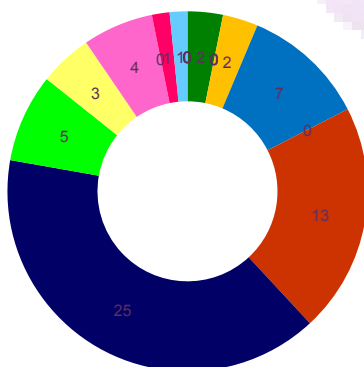
Impact in the Wider Economy – New Hub vs. Base Case

GVA Impact (£m)	£64
Employment Impact	530

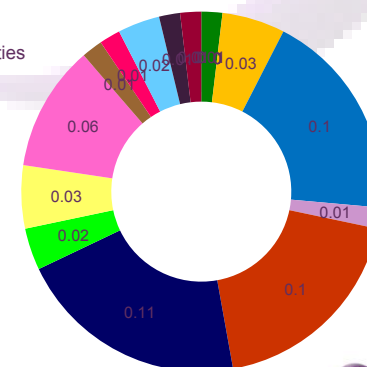
Key Messages

- Given the relatively limited impact of either Runway 3 or a New Hub on passenger numbers and the relatively strong existing hub. connections, it is unsurprising that economic benefits to passengers and the airport are limited.
- Runway 3 offers no difference over the Base Case and, consequently, there are no benefits.
- The New Hub enables some additional travel and additional flights so there are some limited benefits. This equates to around £2.1 million per annum in 2050.
- However, despite the limited impact on traffic, the increased level of business traffic is valuable to the wider economy. The GVA and employment impact in the wider economy in 2050 is estimated to be around £64 million and 530 jobs.

GVA Impact by Sector in 2050 (£m)



Jobs Impact by Sector in 2050 (000s)



Route Summary – Newquay

- Four Runway Hub offers three more flights per day than the Base Case and also three more than a Third Runway
- Four Runway Hub delivers £44 million per annum in direct benefits to users and the airport. £44 million more than a third runway
- It will deliver £33 million in GVA benefits and 460 jobs in the wider economy, principally in the Real Estate, Transport & Storage and Financial & Insurance Services sectors

Nature & Quality of Current Connections

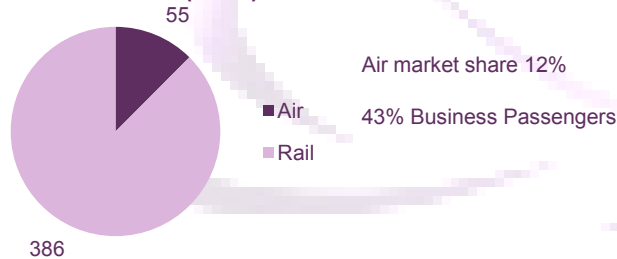
Status of Heathrow Connection	No service
Air Travel Time to Central London	130 minutes
Other London Air Services	Gatwick, 2 per day
Other Hub Services (Flights per day)	None
No. of Direct Rail Services & Travel Time to Central London	None 345 minutes
Impact of HS2 on Travel Times	None

Air travel time to central London includes an allowance for transiting the airports and travel to the centre.

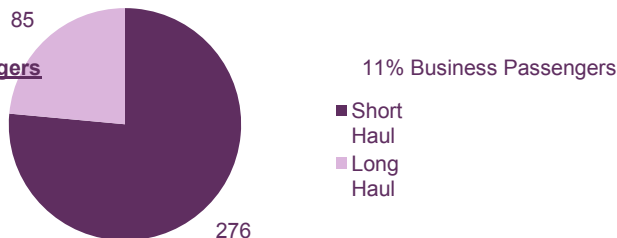
- Newquay Airport provides primary air access to Cornwall in the far South West. Tourism is a key driver of the economy and the county receives around 4.3 million visitors each year.
- There is no current connection to Heathrow, although there has been one in the past. There are, however, services to Gatwick.
- The area is one of the most geographically isolated parts of the UK and, consequently, air journey times are substantially better than rail times. However, the lack of air service capacity means that air market share is still very low.
- International markets are generally small but there is no other hub competition currently and developing a hub service to another point would be difficult given the lack of point to point traffic.

Core Catchment Demand in 2013 (000s)

London Passengers



International Passengers



Key Economic & Demographic Information

	2014	2050	CAGR
GVA (£m, 2010 prices)	£1,449	£3,295	2.4%
GVA per capita	£13,933	£27,008	1.9%
Population	104,000	122,000	0.5%
Key Sectors	Primary & Secondary, Trade & Hospitality		
Drivers of Growth	Professional Services, ICT, Admin & Real Estate		
Visitors in 2012	4.0 million domestic, 0.3 million international		
Employment in Foreign Owned Companies	400		
FDI Jobs as a % of Total Employment in Nation / Region	0.2%		

Route Summary – Newquay

- The size of the market around Newquay means that it is only really suitable for serving via small aircraft types. These do and will struggle to survive at a constrained Heathrow as they do not offer a sufficient level of revenue intensity. Hence, we do not believe that a service will operate in either the Base Case or the Runway 3 case.
- However, with an unconstrained New Hub, we believe that a three times daily service with a 100 seat aircraft could be operated. The balance would be towards London bound traffic, reflecting the market sizes, but there would be a sufficient onward component to make a hub service viable. This may have some impact on the viability of the Gatwick service.
- We would anticipate the route carrying around 186,000 passengers per annum in 2050.

London Hub Route Forecast (000s)

	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	0	0	0	105
<i>Business</i>	0	0	0	43
<i>Leisure</i>	0	0	0	62
Hubbing in London	0	0	0	80
<i>Business</i>	0	0	0	57
<i>Leisure</i>	0	0	0	24
Total	0	0	0	186
<i>Business</i>	0	0	0	100
<i>Leisure</i>	0	0	0	86
Daily Flights	0	0	0	3
Aircraft Size	-	-	-	100

Route Summary – Newquay

Additional City Region Economic Impacts Compared to the Base Case in 2050

Economic Benefits to Passengers and Airports (£m)

	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£0.0	£43.1	£43.1
Travelling to London	£0.0	£12.2	£12.2
Business	£0.0	£8.5	£8.5
Leisure	£0.0	£3.8	£3.8
Hubbing in London	£0.0	£30.8	£30.8
Business	£0.0	£24.2	£24.2
Leisure	£0.0	£6.6	£6.6
Producer Benefits	£0.0	£0.5	£0.5
Total	£0.0	£43.6	£43.6

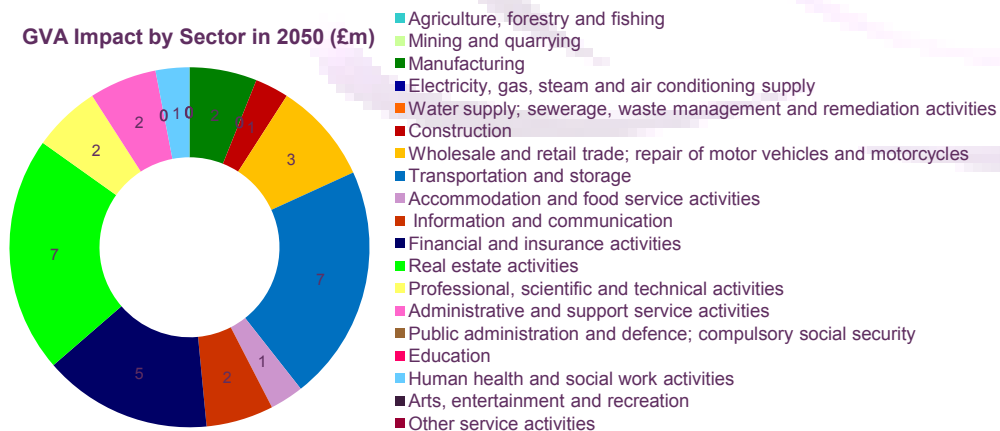
Impact in the Wider Economy – New Hub vs. Base Case

GVA Impact (£m)	£33
Employment Impact	460

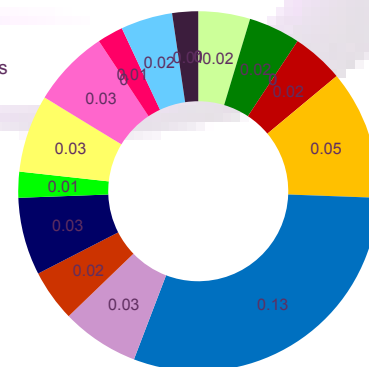
Key Messages

- The inaccessibility of Newquay and Cornwall combined with the lack of access to hub services now and the distance from the nearest alternative, means that the New Hub scenario results in significant economic benefits for passengers and the airport.
- The primary driver of benefits is passengers hubbing in London, where the nearest likely alternative service for these passengers is at Bristol Airport, over two hours drive away.
- In total, we estimate economic benefits to passengers and the airport of around £43.6 million in 2050.
- In the context of the Newquay and Cornwall economies, the GVA impact in the wider economy is also significant. In 2050, the new service is expected to support around £33 million in GVA and 460 jobs. This is spread across a range of sectors.

GVA Impact by Sector in 2050 (£m)



Jobs Impact by Sector in 2050 (000s)



Route Summary – Plymouth

- If Plymouth Airport is reopened, a Four Runway Hub has the potential to offer three more flights per day than the Base Case or a Third Runway
- Four Runway Hub delivers £55 million per annum in direct benefits to users and the airport. £55 million more than a third runway
- It will deliver £33 million in GVA benefits and 330 jobs in the wider economy, largely in the Financial & Insurance Services sector

Nature & Quality of Current Connections

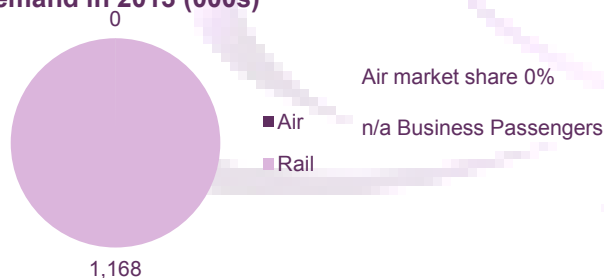
Status of Heathrow Connection	No service
Air Travel Time to Central London	128 minutes
Other London Air Services	None
Other Hub Services (Flights per day)	None
No. of Direct Rail Services & Travel Time to Central London	12 208 minutes
Impact of HS2 on Travel Times	None

Air travel time to central London includes an allowance for transiting the airports and travel to the centre.

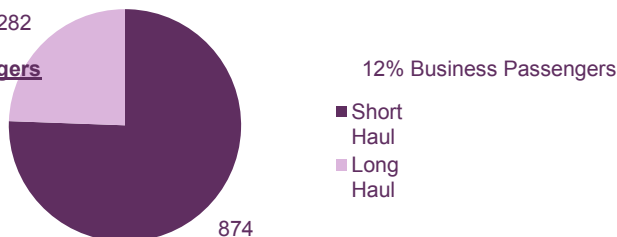
- Plymouth has in the past had connections to Heathrow and the other London airports. However, the airport is not currently operating.
- Air journey times do offer benefits over and above rail journey times, which suggests that some penetration of the London bound market should be possible.
- International markets are relatively small but should be sufficient to support a hub service by 2050.

Core Catchment Demand in 2013 (000s)

London Passengers



International Passengers



Key Economic & Demographic Information

	2014	2050	CAGR
GVA (£m, 2010 prices)	£4,578	£9,319	2.0%
GVA per capita	£17,540	£33,522	1.8%
Population	261,000	278,000	0.2%
Key Sectors	Public Services		
Drivers of Growth	ICT, Professional Services, Admin & Real Estate		
Visitors in 2012	5 million domestic, 0.4 million international		
Employment in Foreign Owned Companies	50		
FDI Jobs as a % of Total Employment in Nation / Region	0.2%		

Route Summary – Plymouth

- The market sizes for onward traffic and the relative proximity of London limit the overall scale of the market for a service. Consequently, again, a service of any frequency is likely to require a relatively small aircraft. These are unlikely to operate from a constrained hub such as Heathrow in either the Base Case or Runway 3 case.
- However, at an unconstrained New Hub, there would appear to be the possibility for a three times daily service with a 100 seat aircraft. This would handle around 186,000 passengers in 2050, with the balance towards onward connecting traffic. Ultimately, however, it should be remembered that delivery of this route is dependent on the availability of an operational Plymouth Airport.

London Hub Route Forecast (000s)

	2013	2050		
		Base	Runway 3	New Hub
Travelling to London	0	0	0	50
<i>Business</i>	0	0	0	25
<i>Leisure</i>	0	0	0	26
Hubbing in London	0	0	0	135
<i>Business</i>	0	0	0	78
<i>Leisure</i>	0	0	0	57
Total	0	0	0	186
<i>Business</i>	0	0	0	103
<i>Leisure</i>	0	0	0	83
Daily Flights	0	0	0	3
Aircraft Size	-	-	-	100

Route Summary – Plymouth

Additional City Region Economic Impacts Compared to the Base Case in 2050

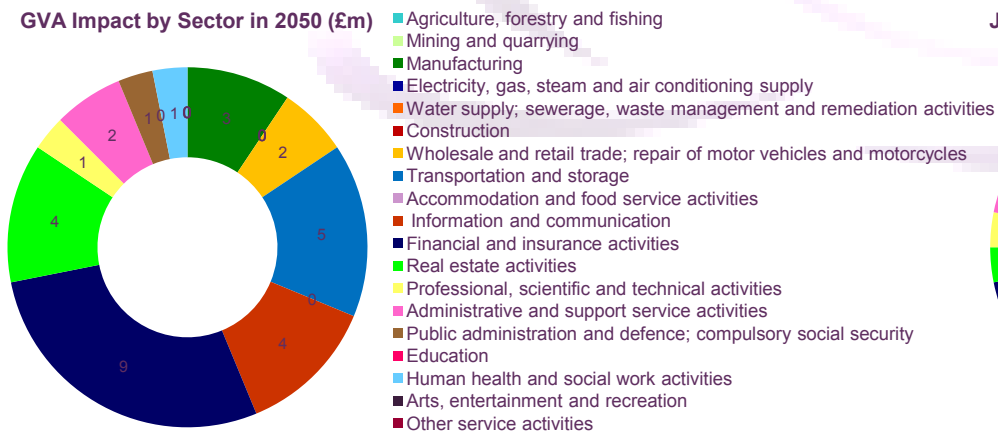
Economic Benefits to Passengers and Airports (£m)

	Runway 3	New Hub	Additional Benefits from a New Hub
Passenger Benefits	£0.0	£54.5	£54.5
Point to Point	£0.0	£6.0	£6.0
Business	£0.0	£4.7	£4.7
Leisure	£0.0	£1.3	£1.3
Onward	£0.0	£48.5	£48.5
Business	£0.0	£34.4	£34.4
Leisure	£0.0	£14.1	£14.1
Producer Benefits	£0.0	£0.6	£0.6
Total	£0.0	£55.0	£55.0

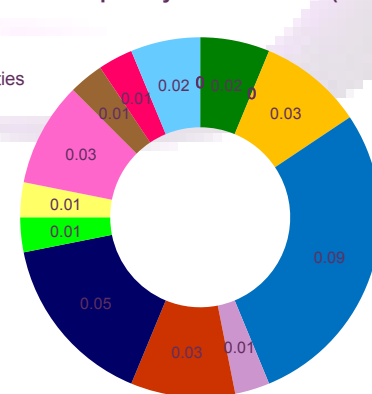
Impact in the Wider Economy – New Hub vs. Base Case

GVA Impact (£m)	£33
Employment Impact	330

GVA Impact by Sector in 2050 (£m)



Jobs Impact by Sector in 2050 (000s)



Key Messages

- The key driver of economic benefits for passengers for the Plymouth route is those connecting in London. The lack of a hub service and the distance required to travel to a likely alternative, Bristol, is such that the service substantially improves accessibility to Plymouth.
- This results in total economic benefits to passengers and the airport of around £55 million.
- The impact of the New Hub service on GVA in the wider economy is also potentially significant. By 2050, the route is expected to support around £33 million of GVA and 330 jobs, spread across a range of sectors.

APPENDICES



European Comparisons



Connectivity at Heathrow and European Comparators Hubs

Whilst connections from UK regional points to Heathrow have declined, other European hubs have been able to maintain their connections to smaller regional points, including those in the UK. As we illustrate:

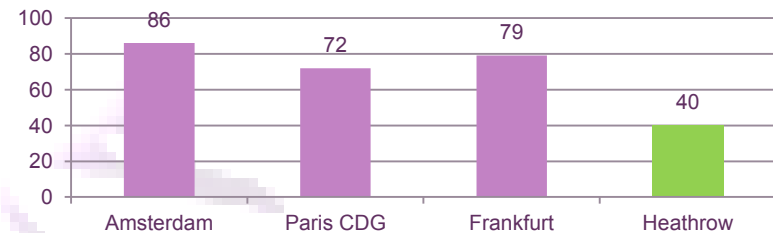
- they serve substantially more either domestic destinations or international destinations within 2 hours flying time;
- they offer connections to cities with smaller air transport markets.

It is notable that Amsterdam and Paris serve significantly more UK regional points than Heathrow - 20 and 13 respectively (including the Channel Islands) in July 2014, compared to 7. Not all of the services are operated by the hub carrier.

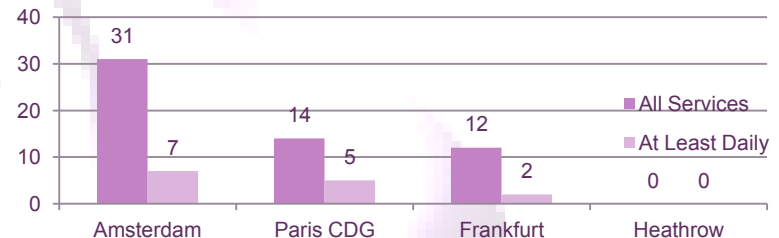
Prima facie, there are a number of reasons why European hubs have sustained a higher level of domestic or short distance connections:

- although each of the hub airports has a dominant airline operating a hub and spoke model, the extent to which each airline is reliant on hub traffic to make routes viable is different;
- London is relatively peripheral and is not ideally placed to capture European transfer traffic;
- the multiple airport system in London means that there are more options for airlines to choose when serving the city. Not all need access to the hub
- airport capacity constraints at Heathrow make BA pick and choose which routes they serve to a greater extent and limits flexibility.

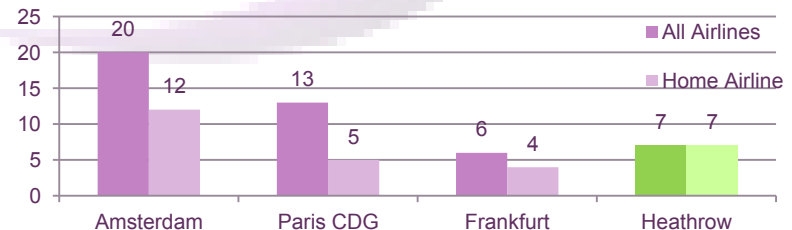
Number of Domestic and Sub 2 Hour Connections



Number of Airports Served with Less than 1 Million Passengers per annum



Number of UK Regional Airports Served



Why is Heathrow less effective at sustaining Regional Connections

A key factor which may explain why fewer regional connections are maintained at Heathrow is the fact that the local London market is stronger than that of the other hub cities, making Heathrow less reliant on transfer traffic to enable the broader network to be sustained.

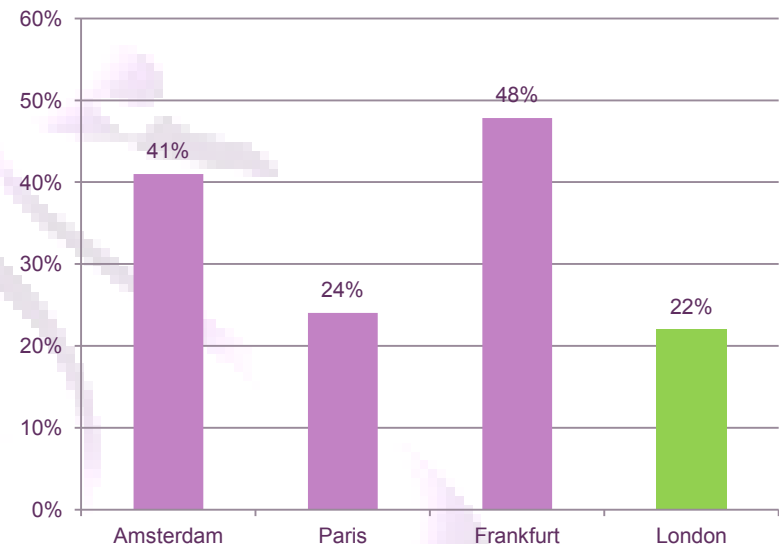
The chart opposite shows the percentage of traffic hubbing at the airports in each city. The difference between Amsterdam or Frankfurt and London is stark. The level of hub connecting traffic is much higher in the other cities. Ultimately, this reflects the size of the underlying catchment economies. Heathrow and London do not need transfer traffic to the same degree to support a good route network. Therefore, when capacity is constrained, this traffic is forced out.

The only real comparator is Paris, which has a similar level of overall transfer traffic. However, it is also probably the only city in Europe that could be described as being on a similar economic scale to London.

This leads to the question of why London is less effective at maintaining domestic connectivity than Paris, which in turn leads to a number of the other factors described above.

Key amongst these is ultimately capacity constraints. Heathrow is full. The other European hubs are not. As has been seen, this has changed the way airlines behave at Heathrow. route decisions become much more about selecting the best route opportunity rather than simply whether any individual market is viable. BA (and others) must optimise its use of slots to generate profits. This results in:

% of Air Passengers Hubbing in Each City



- a drive to maximise revenue from every slot;
- a loss of flexibility in airlines' operational profiles;
- risk aversion and a slowness to develop new routes.

These factors combine to make serving domestic and smaller feeder type destinations more difficult.

The Impact of Capacity Constraints at Heathrow

The evidence for the impact of capacity constraints at Heathrow can be seen in a number of places outside of the simple decline in domestic and short haul connectivity that is often cited:

- the need to maximise revenue pushes the airline to maximise seats per slot to gain more revenue. This means larger aircraft with higher operating costs that need larger markets to sustain services. This effect can be seen clearly at Heathrow. The average size of aircraft on domestic and short distance routes is much higher at Heathrow;
- eventually this leads to flexibility being lost as smaller aircraft are lost from the fleet because there is no use for them. This means that the airline cannot effectively smaller domestic and short haul markets even if it wanted to. Again, this can be seen in the Table opposite. The minimum aircraft size at Heathrow is much higher;
- constraint also influences the type of airline that might serve the hub. Slots become very expensive and there becomes increasingly less incentive for airlines that do not need to be at the hub (i.e. those with no interest in transfer traffic) or whose business models focus on aircraft that are not suitable in size terms to be there (e.g. regional airlines). This reduces the options in terms of airlines that might serve smaller domestic and short haul markets. This can be seen at Heathrow. At the other hubs low cost carriers and regional type airlines still have a presence in the Top 10 airlines (circled in orange). There are none in the Top 10 at Heathrow

Average and Minimum Aircraft Sizes for Home Airlines on Domestic and Sub 2 Hour International Routes

	Amsterdam Schiphol	Paris CDG	Frankfurt	Heathrow
Average Aircraft Size (seats)	113	129	134	146
Minimum Aircraft Size (seats)	80	70	62	126

Top 10 Airlines on Domestic and Sub 2 Hour Destinations by Frequency

Amsterdam		Paris CDG		Frankfurt		Heathrow	
KLM	7024	Air France	6081	Lufthansa	9117	BA	5353
Easyjet	1055	Easyjet	947	BA	285	Lufthansa	724
BA	439	Lufthansa	618	SAS	195	AerLingus	709
Lufthansa	362	BA	197	AirFrance	194	Virgin	360
AirFrance	345	Flybe	197	Austrian	180	Swiss	356
Flybe	279	KLM	180	KLM	176	KLM	328
SAS	231	Swiss	180	Croatia Airlines	167	germanwings	317
AerLingus	206	Aer Lingus	150	Air Berlin	139	SAS	271
Transavia.com	194	SAS	102	Luxair	120	Air France	240
Swiss	120	Air Europa	90	Swiss	117	Brussels Airlines	86

Summary of Heathrow's Comparative Regional Connectivity

A further factor is London's geographic position. Ultimately, the extent to which a hub airport can serve thinner routes is, to a significant extent, a function of its location. Passengers do not like to back track and it is hard for the hub airline to compete if it consistently has to fly passengers further.

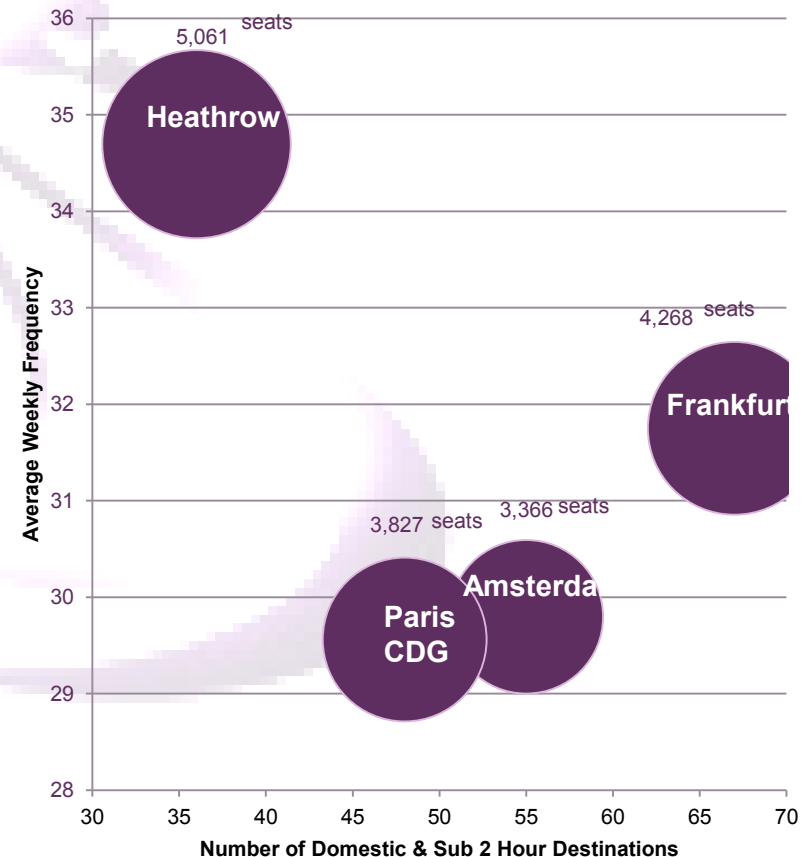
London is well placed as a hub for Europe to / from North America but it is poorly positioned for intra European or eastbound connectivity. This limits the extent to which it is worth BA entering small European markets as it will find it hard to compete effectively in a significant proportion of onward markets. This point can be demonstrated by considering the average distances between the main hub airports and the 27 EU capitals: Amsterdam Schiphol – 721 miles; Paris CDG – 764 miles; Frankfurt – 648 miles; and Heathrow – 843 miles.

London is simply more peripheral. This makes it hard for an airline based in the city in some markets.

Overall, the result is that Heathrow currently serves domestic and short haul destinations quite differently to its European comparators. The combination of less requirement for transfer traffic, capacity constraints and geographic position means it focusses on major city markets offering strong point to point flows, which can support larger aircraft sizes, but that also offer the greatest chance to capture higher value hub traffic.

The chart opposite demonstrates this point. It shows the number of domestic and short distance destinations served by the home airline, the average weekly flights to each destination and the size of the discs shows the average number of weekly seats on each route. Heathrow serves a small number of destinations, at a high frequency (which suits high value business travellers), at a high seat capacity. Conversely, Amsterdam serves a large number of destinations, at a considerably lower frequency (but enough to allow efficient hubbing), at a much lower seat capacity. It is much more geared towards smaller markets

Home Airlines: Number of Domestic and Sub 2 Hour Destinations vs Average Weekly Frequency per Destination vs Average Weekly Seat Capacity per Destination



Potential Route Opportunities – Initial Sift & Supporting Data



Narrowing down the List

Our first step was to consider which of the long list of airport/cities had a realistic prospect of sustaining a service to the four runway hub in 2050. We examined a number of parameters as set out in the data appendix. Fundamentally, the principal factors which we considered would give the best indication of the likelihood of new hub connections being introduced or existing connections retained in the more constrained scenarios were:

- the comparative air/surface (fastest) journey time taking into account HS2 impacts as routes where there is little or no journey time savings over rail or road are unlikely to be operated unless there are high volumes of potential connecting passengers at the hub;
- the scale of current air passenger market from the airport's catchment area to London as an indication of the scale of point to point market and current connecting traffic;
- the number of London connecting passengers to/from the airport's catchment area as an indicator of the extent to which connecting passenger demand would sustain a hub service;
- GVA per capita as an indicator of the prosperity of the area; and
- the number of foreign owned firms as an indicator of the internationalisation of the economy..

We ranked the airports according to these parameters as set out on the next page. Those airports which we excluded from further consideration are highlighted in yellow:

- Prestwick as it functions largely as an alternative to Glasgow Airport;
- Carlisle due to the low relative market size and the relatively low level of journey time saving over surface modes post HS2;
- Doncaster Sheffield due principally to the additional journey time by air coupled with the relative size of the market;
- Blackpool due principally to the limited journey time saving coupled with the small size of the market and the relative proximity of Manchester and Liverpool;
- Swansea due to the small size of the market and the relative proximity to Cardiff;
- Anglesey due to the small size of the market and the low internationalisation of the economy.

We included Plymouth for further consideration on the basis that it might be an alternative to Exeter on a triangular route with Newquay should the Airport be reopened.

These broad parameters were refined to include the characteristics of passengers and the scale of connecting passenger markets, as well as the availability of alternative hub connections in producing the more detailed route by route projections as outlined in the next section.

Summary Ranking of Airports

	Air journey time saving after HS2	Current air passengers to London	Number of connecting passengers	GVA per capita	No. of Foreign Owned Companies	Total rank
Edinburgh	10	1	1	2	3	1
Aberdeen	4	4	4	1	5	2
Belfast	2	3	3	5	7	3
Glasgow	8	2	2	4	4	3
Manchester	23	5	5	6	1	5
Newcastle	19	6	6	8	10	6
Dundee	6	7	7	10	20	7
LeedsBradford	22	12	9	7	2	8
Durham/ TeesValley	14	11	8	13	11	9
Inverness	3	8	10	18	19	10
Prestwick	5	9	12	21	17	11
Liverpool	21	14	14	9	9	12
Derry	1	10	15	22	22	13
Newquay	7	13	11	20	21	14
Cardiff	17	20	20	12	5	15
Exeter	15	23	21	3	13	16
Humberside	16	19	19	11	12	17
Carlisle	13	16	17	15	17	18
Doncaster Sheffield	20	17	16	17	8	18
Blackpool	18	15	13	19	15	20
Plymouth	9	22	21	14	16	21
Swansea	12	21	21	16	13	22
Anglesey	11	18	18	23	23	23

Metrics and Criteria

We sought to assemble a range of consistent data about the regional connectivity options as identified by TfL but there were some data gaps at this initial stage due to airports being surveyed in different years. Some elements of the data were not able to be completed for all airports at the initial sift stage. We, nonetheless considered there to be enough information available to eliminate some of the opportunities. For those carried forward, we used the data available to assess the impact of the hub connectivity.

The data we have considered includes:

- Distance to London (flight to LCY as proxy for centre)
- Flight journey time to London (best estimate based on times at other UK airports)
- Population main conurbation
- GVA (£m) and GVA per capita
- Average daily frequency to LHR
- Previously existing connections to LHR
- Historic (1990) Total LHR Passengers (P2P+Connecting)
- Current air passengers on all London services, business % and connecting %
- Size of existing London rail market (estimated)
- Total air market share (%)
- P2P air market share (%)
- Total catchment area air travel market
- Size of long haul markets from core catchment, size of long haul business markets and premium class traffic
- Direct rail, rail frequency and journey time to Central London
- Road Journey Time
- Service to other London airports and frequency
- Other hub services - alliance services via Amsterdam, Paris, Frankfurt, Dubai, Doha, Newark, Chicago or Atlanta
- Number of other hubs served, weekly and daily frequencies and online connection ability
- Level of HS2 impact (High / Partial / Limited / None), estimated % reduction in journey time and estimated new rail journey time
- No of domestic and international tourism arrivals, including non-Europe visitors
- No. of Foreign Owned Companies
- Employment in Foreign Owned Companies
- Value of Regional exports (goods & services)

Existing Routes

		Aberdeen	Edinburgh	Glasgow	Belfast City	Newcastle	Manchester	Leeds Bradford
Evidence / Indicator								
Distance to London (flight to LCY as proxy for centre)		404	338	354	327	255	161	178
Flight time to London (best estimate based on times at other UK airports)		95	87.5	85	80	80	65	70
Population main conurbation		217	831	1,473	654	1,094	2,587	2,231
GVA (£m)		£7.3	£25.9	£34.9	£14.8	£22.1	£52.8	£45.4
GVA per capita		£32,680	£30,285	£22,973	£21,808	£19,543	£19,802	£19,737
Average daily frequency to LHR		11	17	8	9	5	12	3
Previously existing connection to LHR?		Existing	Existing	Existing	Existing	Existing	Existing	Existing
Historic (1990) Total LHR Passengers (P2P+Connecting)		464,649	1,394,268	1,416,159	0	388,923	1,036,500	225,341
Current air passengers to London		1,047,105	2,465,344	2,045,201	1,764,792	381,615	522,018	116,901
Business passenger %		47%	47%	46%	41%	35%	59%	38%
Connecting passenger %		30%	24%	22%	21%	64%	59%	75%
Size of existing London rail market (est)		98,073	983,962	574,576	0	1,113,780	4,974,620	2,467,914
Total air market share (%)		91%	71%	78%	100%	26%	9%	5%
P2P air market share (%)		88%	66%	74%	100%	11%	4%	1%
Total catchment area air passenger market		2,908,882	7,961,679	7,564,083		2,890,623	11,951,218	6,300,683
Size of long haul markets from core catchment		395,072	1,007,197	907,278	116,551	515,604	1,934,313	
Business traffic to long haul destinations from core catchment		159,394	190,660	133,747	19,393	83,984	329,284	
Premium class traffic to long haul destinations from core catchment		35,239	15,480	11,804	n/a	13,402	71,100	
Competition Indicators								
Direct rail		Y	Y	Y	N	Y	Y	Y
Rail frequency		4	23	21		31	48	32
Rail Journey Time (fastest)		420	258	270	725	156	120	119
Road Journey Time		520	406	379		279	209	200
Other London airports		Y	Y	Y	Y	Y	N	N
Other air frequency		5	20	7	3	1	0	0
Other hub services		Y	Y	Y	N	Y	Y	Y
Number of other hubs (aligned in brackets)		3 (3)	6 (6)	4 (3)	0	3 (3)	10 (10)	2 (1)
Average weekly daily frequency to other hubs (aligned in brackets)		11 (11)	18 (16)	10 (8)	0	10 (9)	29 (26)	6 (4)
Average daily frequency per hub (aligned in brackets)		4 (4)	3 (3)	3 (3)	0	3 (3)	3 (3)	3 (4)
Level of HS2 Impact (High / Partial / Limited / None)		Limited	Limited	Limited	None	Partial	High	High
Estimated % Reduction in Journey Time		-11%	-17%	-11%	0%	-22%	-50%	-42%
Estimated new rail journey time		375	213	240	725	122	60	69
International Economy Indicators								
No of domestic tourism arrivals		1,370,000	2,350,000	1,730,000		1,641,000	3,485,000	2,701,000
No of international tourism arrivals		209,000	1,302,000	516,000	1,562,000	277,000	1,070,000	454,000
No of non-Europe visitors (if available)								
No. of Foreign Owned Companies		265	335	285	250	160	930	735
Employment in Foreign Owned Companies		33,511	42,767	66,310	28,458	28,975	133,033	303,415
Value of Regional exports (goods & services)								

Likely Routes

		<i>Liverpool</i>	<i>Dundee</i>	<i>Derry</i>	<i>Belfast International</i>	<i>Durham / Tees Valley</i>	<i>Liverpool</i>	<i>Cardiff</i>	<i>Newquay</i>
Evidence / Indicator									
Distance to London (flight to LCY as proxy for centre)		449	364	386	340	217	176	147	232
Flight time to London (best estimate based on times at other UK airports)		110	90	93	80	71	66	62	70
Population main conurbation		233	152	108	654	659	2,353	1,308	533
GVA (£m)		£3.5	£2.9	£1.3	£14.8	£12.0	£46.7	£24.1	£7.0
GVA per capita		£15,021	£18,637	£12,457	£21,808	£17,731	£19,220	£17,861	£13,060
Average daily frequency to LHR		0	0	0	0	0	0	0	0
Previously existing connection to LHR?		Yes		No	Yes	Yes	Yes	No	Yes
Historic (1990) Total LHR Passengers (P2P+Connecting)		133,206	0	0	1,116,606	196,722	112,076	0	41,200
Current air passengers to London		318,927	363,081	231,924	1,764,792	124,241	61,339	1,242	92,259
Business passenger %		26%	42%	29%	41%	30%	40%	100%	42%
Connecting passenger %		23%	28%	16%	21%	76%	79%	100%	73%
Size of existing London rail market (est)		46,586	87,446	0	0	547,761	1,168,180	1,147,255	385,729
Total air market share (%)		87%	81%	100%	100%	18%	5%	0%	19%
P2P air market share (%)		84%	75%	100%	100%	5%	1%	0%	6%
Total catchment area air passenger market		840,904	1,200,756	931,700	6,303,198	1,958,692	3,539,348	2,203,568	3,666,698
Size of long haul markets from core catchment		76,691	60,098	14,688	133,238		538,887	0	13,177
Business traffic to long haul destinations from core catchment		14,779	7,640	4,348	63,798		84,905	0	5,589
Premium class traffic to long haul destinations from core catchment		2,655	6,029	n/a	n/a		19,768	0	0
Competition Indicators	Direct rail	Y	Y	N	N	N	Y	Y	N
	Rail frequency	2	4				17	29	
	Rail Journey Time (fastest)	475	343	845	725	178	124	119	354
	Road Journey Time	544	451			248	217	156	272
	Other London airports	Y	Y	Y	Y	N	N	N	Y
	Other air frequency	3	2	1	10	0	0	0	2
	Other hub services	Y	N	N	Y	Y	Y	Y	N
	Number of other hubs (aligned in brackets)	1 (1)	0	0	3 (1)	1 (1)	2 (0)	1 (1)	0
	Average weekly daily frequency to other hubs (aligned in brackets)	1 (1)	0	0	3 (1)	3 (3)	3 (0)	3 (3)	0
	Average daily frequency per hub (aligned in brackets)	1 (1)	0	0	1 (1)	3 (3)	2 (0)	3 (3)	0
	Level of HS2 impact (High / Partial / Limited / None)	Limited	Limited	None	None	Limited	Partial	None	None
	Estimated % Reduction in Journey Time	-9%	-13%	0%	0%	-17%	-26%	0%	0%
	Estimated new rail journey time	430	298	845	725	148	92	119	354
International Economy Indicators	No of domestic tourism arrivals	1,860,000	660,000			451,000	1,872,000	1,680,000	3,983,000
	No of international tourism arrivals	406,000	71,000	202,000	1,562,000	56,000	587,000	287,000	308,000
	No of non-Europe visitors (if available)								
	No. of Foreign Owned Companies	40	35	20	250	105	175	265	30
	Employment in Foreign Owned Companies	2,558	2,053	1,390	28,458	47,558	44,284	54,727	400
	Value of Regional exports (goods & services)								

Possible Routes

	Prestwick	Carlisle	Blackpool	Humberside	Doncaster Sheffield	Angley	Swansea	Exeter	Plymouth
Evidence / Indicator									
Distance to London (flight to LCY as proxy for centre)	336	265	203	144	143	229	178	160	196
Flight time to London (best estimate based on times at other UK airports)	86	77	69	61	61	72	66	64	68
Population main conurbation	374	108	142	424	1,313	70	231	117	258
GVA (£m)	£4.8	£1.8	£1.9	£7.8	£23.0	£0.7	£4.1	£2.9	£4.7
GVA per capita	£12,834	£17,127	£13,380	£18,467	£16,955	£10,000	£17,019	£24,898	£17,408
Average daily frequency to LHR	0	0	0	0	0	0	0	0	0
Previously existing connection to LHR?	No	Yes	Yes	Yes	No	No			Yes
Historic (1990) Total LHR Passengers (P2P+Connecting)	0	0	0	24,415	0	0	0	0	37,149
Current air passengers to London	253,948	45,636	60,508	13,725	35,375	20,633	881	0	301
Business passenger %	34%	34%	33%	23%	33%	23%	0%	0%	0%
Connecting passenger %	26%	66%	89%	93%	90%	97%	0%	0%	0%
Size of existing London rail market (est)	27,273	558,147	147,928	243,314	1,683,401	39,307	266,441	1,008,574	313,018
Total air market share (%)	90%	8%	29%	5%	2%	34%	0%	0%	0%
P2P air market share (%)	87%	3%	4%	0%	0%	2%	0%	0%	0%
Total catchment area air passenger market	1,145,836	690,595	2,249,703	1,440,408	2,286,470	427,858	1,259,355	966,390	1,334,903
Size of long haul markets from core catchment	127,208	131,653	449,247	0	115,755	0	0	0	0
Business traffic to long haul destinations from core catchment	23,391	19,032	69,264	0	12,395	0	0	0	0
Premium class traffic to long haul destinations from core catchment	2,651	1,908	13,677	0	0	0	0	0	0
Competition Indicators									
Direct rail	N	Y	N	Y	Y	N	Y	Y	N
Rail frequency		24		8	15		19	27	
Rail Journey Time (fastest)	340	201	168	156	120	221	176	136	211
Road Journey Time	412	299	238	216	175	282	188	193	231
Other London airports	N	N	N	N	N	N	N	N	N
Other air frequency	0	0	0	0	0	0	0	0	0
Other hub services	N	N	N	Y	N	N	N	Y	N
Number of other hubs (aligned in brackets)	0	0	0	1 (1)	0	0	0	2 (2)	0
Average weekly daily frequency to other hubs (aligned in brackets)	0	0	0	3 (3)	0	0	0	2 (2)	0
Average daily frequency per hub (aligned in brackets)	0	0	0	3 (3)	0	0	0	1 (1)	0
Level of HS2 impact (High / Partial / Limited / None)	Limited	Partial	Partial	None	None	Partial	None	None	None
Estimated % Reduction in Journey Time	-9%	-22%	-26%	0%	0%	14%	0%	0%	0%
Estimated new rail journey time	310	157	124	126	90	191	176	136	211
International Economy Indicators									
No of domestic tourism arrivals	690,000	3,584,000	3,018,000	1,682,000	1,768,000	n/a	1,184,000	5,082,000	5,082,000
No of international tourism arrivals	90,000	215,000	248,000	51,000	207,000	53,000	73,000	418,000	418,000
No of non-Europe visitors (if available)									
No. of Foreign Owned Companies	45	45	55	90	180	10	65	65	50
Employment in Foreign Owned Companies	4,693	8,111	3,341	10,098	20,458	0	10,681	2,716	50
Value of Regional exports (goods & services)									

Approach to Assessing Direct Benefits to Passengers and Airports



Measuring Direct Economic Benefit to Passengers and Airports

York Aviation's work in relation to the economic benefits of new domestic connections to a new hub airport or indeed the benefits associated with increased domestic capacity at Heathrow with a third runway has focussed on considering the impact of changes in the market on the generalised cost of travel to passengers and the impact on airport revenues. This is sometimes referred to as an analysis of transport economic efficiency.

Passengers

Essentially, the approach aims to estimate the extent to which new routes or increased frequency or capacity on existing reduces journey or wait times or reduces fares. To the extent that they do, the reductions in time spent travelling or in travel costs represent an economic benefit to passengers. Time savings are then monetised using Department for Transport values of time for air travellers.

The precise technique used for different groups of passengers varies as our assumptions about their with and without expansion in airport capacity in London varies and, for point to point passengers, the existence of rail as an alternative mode of travel with its own associated travel times and costs, adds a layer of complication. Below, we have set out the method by which we have estimated the economic benefit accruing to each passenger group.

At the outset, there are a number of overarching assumptions or principles that need to be set out:

- the economic benefits set out are always relative measures. They are the benefits that accrue to users from the expansion of capacity in London, either via a new hub airport or a third runway at Heathrow, compared to a base case in which there is no new capacity added;
- the additional point to point passengers carried by routes in the new hub or third runway scenario compared to the Base Case are assumed to be net additional across the UK. This is consistent with Department for Transport 2013 Aviation Forecasts, which identify a significant number of domestic passengers that are priced out of the market and no longer travel in the event of on-going constraint in London;
- unless onward connecting demand is stimulated by improved accessibility (see above), it is assumed that these passengers will continue to travel by air but by another route (e.g. another hub airport). If other options are available it is unlikely that a constraint in London will prevent them from travelling completely.

Point to Point (London Bound) Passengers

The approach taken to assessing the benefits to point to point passengers is dependent on the relationship between the generalised cost of using air travel and that of using rail.

Measuring Direct Economic Benefit to Passengers and Airports

The generalised cost of each option is assessed based on the journey time, the wait time and a notional average fare based on a trawl of internet sites for the relevant route and mode.

If air travel is cheaper in generalised cost terms than rail for the journey, it is assumed that rail is not an appropriate substitute and that any additional passengers in an expanded capacity scenario compared to the Base Case must be priced out of the market and that they will not travel. This is done by applying an additional cost to the generalised cost of air travel and a price elasticity for the type of passenger until the additional demand is equal to zero. The required additional cost multiplied by the number of additional passengers is the benefit that accrues from being able to travel.

If rail travel is cheaper in generalised cost terms than air for the journey a different approach is taken. It is assumed in this case that rail does represent a viable alternative but that for some reason the passenger still prefers air travel. This circumstance is usually driven by the difference in travel time. However, as the passenger shows a preference for air travel, we assume that any travel time benefit is outweighed by their preference and consequently, the impact is zero. Instead, the passenger simply accrues a benefit from the additional choice that comes from the air service existing or additional capacity providing them with the option of travel. This is assumed to be equal to the reduction in wait time offered by the additional frequencies offered to London from the air service. When multiplied by the number of passengers in this group this provides an assessment of the total benefit.

Onward Connecting Passengers

As described above, our overarching assumption is that onward passengers will continue to travel in the event of no new capacity being delivered but that they will travel via another route, assumed to be via another hub airport. This forms the basis for our treatment of benefits to onward connecting passengers.

If the regional airport offers services to other hub airports now, then it is assumed that passengers will be able to switch to these alternative services with little or no impact on generalised cost. The only benefit that will accrue to these passengers is from the additional choice that the new hub service or additional frequency on an existing service will provide. The wait times with and without the expansion of capacity are calculated and the time saving from the additional services calculated. This is then multiplied by the size of the onward connecting market to reflect the benefits to passengers from the change.

If there is no hub service from the relevant regional airport now, it is assumed that in the future passengers will continue to have to travel to the next nearest airport with a hub service to access the destination that they require. Therefore, the benefit to these passengers of expansion of capacity in London is equal to the difference in travel time between their local airport and the alternate airport they would be forced to use. The monetised value of this access time is multiplied by the number of passengers affected to provide a total economic benefit to this group.

Measuring Direct Economic Benefit to Passengers and Airports

Airport Revenues

The final element of our assessment of the impact of the changes in the market brought about by either the construction of a new hub in London or a third runway at Heathrow is to consider how they will impact on local airport revenues. Given the extent of fixed costs within airport businesses, the change in revenues provides a sensible proxy for the impact on producer surpluses.

Our assessment is based on available data on airport revenue per passenger taken from the Airports Statistics Series produced by Leigh Fisher. We have then assumed that revenues from domestic passengers are around 75% of those from international passengers.

Our core assumptions as regards to the alternate travel patterns of passengers then become important:

- for point to point passengers, we have assumed that the additional passengers in the Runway 3 or New Hub scenarios are indeed genuinely additional. Hence, revenue from these passengers is additional to the airport. The resultant positive revenue impact is calculated by multiplying the number of additional point to point passengers by the relevant airport's domestic revenue per passenger;
- for onward connecting passengers, the calculation depends on the existence or otherwise of other hub services at the airport. If such services exist, then onward connecting passengers are assumed to use these services in the Base Case. This means that they are in fact more valuable to the airport in the Base Case than in either the Runway 3 or New Hub scenarios as they attract revenue at the international passenger rate. There is, therefore, a negative impact on revenues equal to the difference between the domestic and international revenues per passenger multiplied by the number of additional onward connecting passengers. If, however, there are no existing hub services, then the additional onward connecting passengers are assumed to be new to the airport as in the Base Case they would have to have used an alternate. Therefore, there is a positive impact on revenues equal to the number of onward connecting passengers multiplied by the domestic revenue per passenger.

The combination of these different economic benefits are set out in each of the route sections.

Approach to Route Forecasting



Passenger Forecast Approach

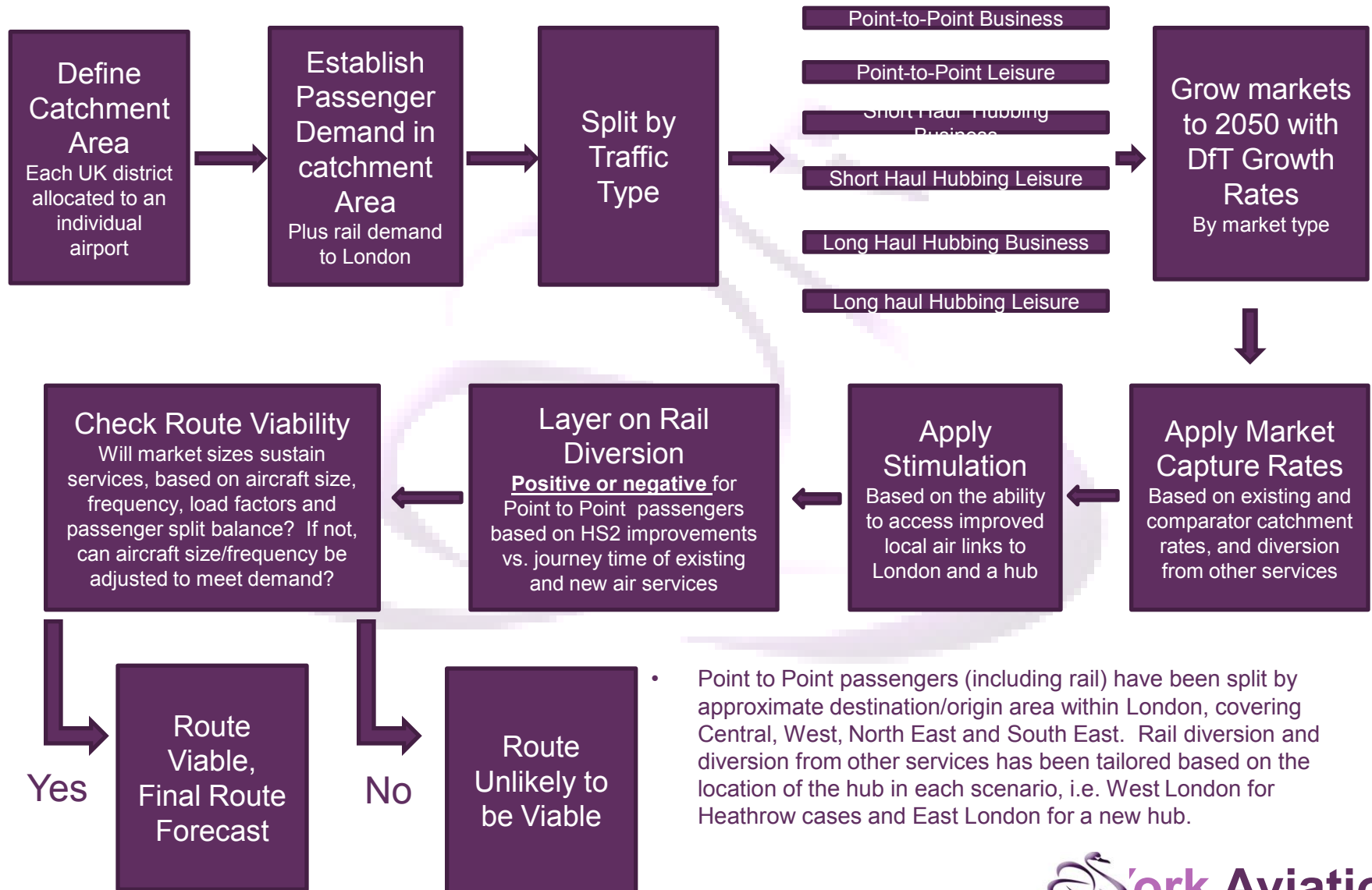
Our approach to forecasting the demand on future services in each scenario is summarised overleaf and our approach follows the principles identified above regarding the availability of capacity for existing and new hub connections from the regions.

In considering which routes are likely to be operated, we have made assumptions about the extent to which services would capture the market, particularly taking into account competition from rail including HS2. We have also consider the balance of point to point, short haul hubbing and long haul hubbing passengers on services to London hubs as having the right balance can be a factor in route viability . Broadly, for routes with existing services, it has been assumed that the current profiles of passenger will continue in the future whilst, for potential new hub routes, we have used comparative demand profiles and market capture rates to assess potential demand.

Assessing the route viability has been an iterative process in which potential future frequencies and aircraft sizes have been adjusted to best match demand.

Overall the results present the scale of potential markets anticipated as the precise take-up of routes is difficult to project 35 years ahead.

Passenger Forecast Approach Flowchart



Route Forecasting Supporting Information

Above, we have set out the broad principles of our approach and some key information. In the following pages we provide additional information on a number of key areas:

- Catchment areas
- Market Definition and Market Sizes
- Growth Rates
- Market Capture Performance
- Stimulation
- Rail Diversion
- Route Viability



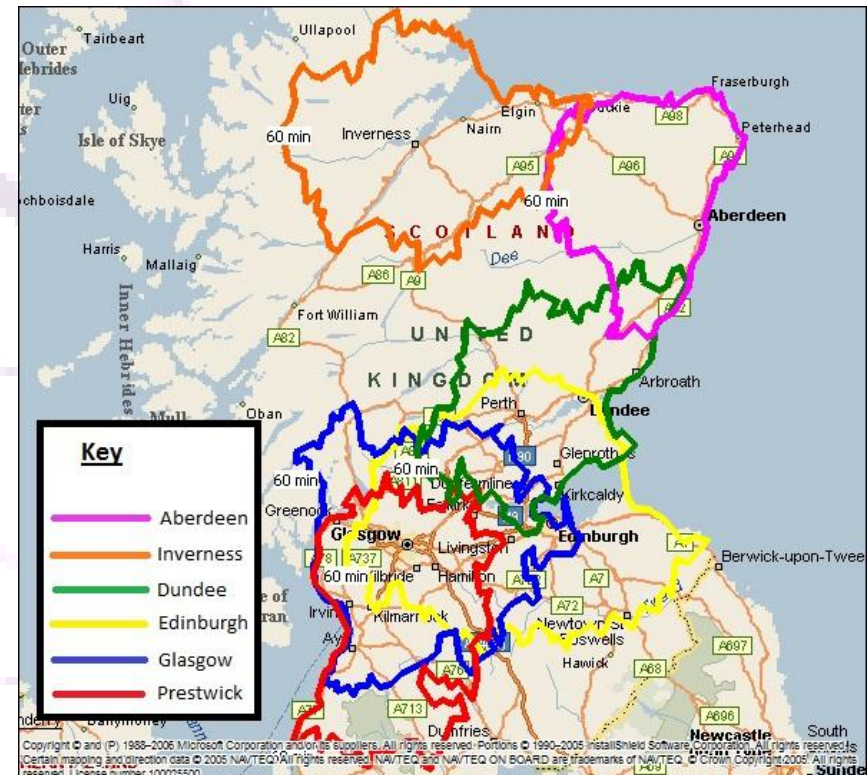
Catchment Areas

The catchment area for each airport has been defined by allocating each district in the UK to a sole airport. There is no overlap of catchment areas on the basis that where attractive services are available to London and a London Hub from a local airport, so passengers would be inclined to choose this over competing airports. In so far as there will be some leakage between catchment areas, we believe it is fair to assume that this will be net neutral.

The catchment areas are broadly 1-hour drive times around each airport, although in certain areas of the country, such as between Manchester and Liverpool, between Manchester and Leeds and in the North East around Durham and Newcastle, there is some degree of overlap and we have allocated these overlap districts based roughly on their proximity and ease of journey to an airport..

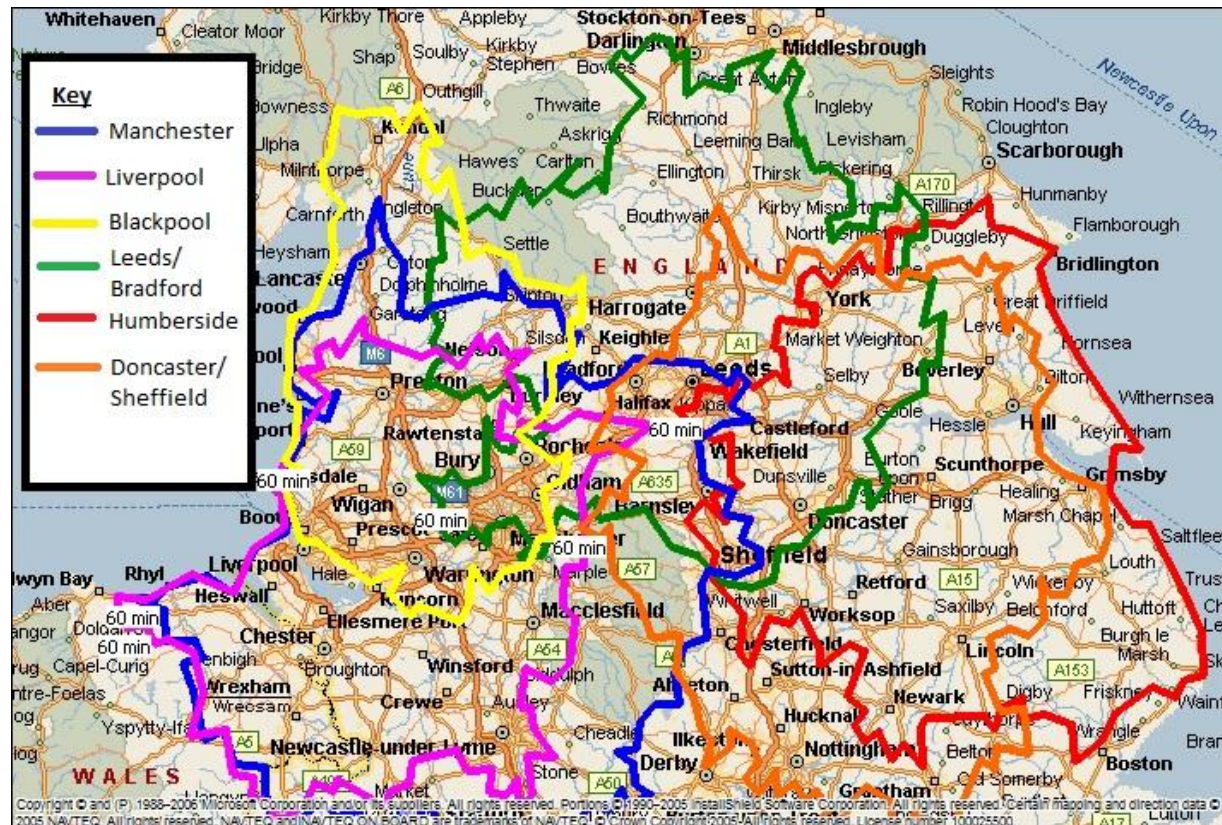
In addition, there are some areas of the UK which fall outside of a 1-hour drive from an airport, such as in the Highlands of Scotland. In these cases, we have allocated based on the nearest airport to the district, or in the case of the Islands off Scotland, the Airport to which most air services are linked.

The following figures show the 1-hour drive time zones for each airport which was originally considered in the Sift. As some airports, such as Swansea and Doncaster, were excluded at this stage, then where they had overlap districts allocated to them, these were reallocated to airports which were taken forward to the full forecast stage.



Source: Microsoft
MapPoint

Catchment Areas (3)



Source: Microsoft
MapPoint

Catchment Market Sizes

The size of the markets within each catchment area has been determined using CAA survey and statistical data from 2010 through to 2013 (provisional final).

We have sought to extract the passengers using the following services:

- Point to Point to London Heathrow
- Point to Point to other London airports
- Short haul hubbing through London airports
- Long haul hubbing through London airports
- Short Haul direct
- Long Haul direct
- Short haul hubbing through non-London airports
- Long haul hubbing through non-London airports

Where recent survey data (2012 and 2013) exists which will adequately cover most of a catchment area (i.e. all likely airports from which people will travel are included) then this is used. For airports included in earlier surveys, we have distributed current throughputs (taken from CAA statistics) based on the average traffic mix seen in previous surveys. For airports which have not been surveyed, but for which data exists at a domestic destination airport (such as London, Manchester etc.) then the passenger mix has been calculated based on the available data. In some cases, data has been combined together from these different approaches in order to estimate the whole market mix (for example, Dundee has been calculated based on CAA survey data from London for the London route and then added to the 2013 Scottish origin airport data).

Catchment Market Sizes (2)

For point to point passengers travelling to London and the surrounding area, we have used the survey data to determine the surface origin/destination of passengers in the London area. We have divided passengers across four areas. These are:

- Central: Boroughs primarily contained within Zones 1&2 of the public transport system;
- West
- North East (including districts north of the River Thames)
- South East (including boroughs south of the River Thames)

Splitting passengers by these areas then allows us to make adjustments to market capture and market potential should the hub move from Heathrow to the East, generating different journey times at the London end of the route which will increase or decrease the appeal of air travel compared to rail travel and the use of alternative London airports.

Routes which currently have services to London Heathrow and/or other London airports, the split by London area is based on existing patterns. However, for airports where there is little or no demand presently to London, the split is generated by using comparator airports, which share characteristics in terms of peripherality from London and rail alternatives. This is inline with the comparators identified in Section 4.

The table below illustrates some examples of the split by zone for existing services.

Origin/Destination Split of Passengers By London Area

			Aberdeen	Belfast	Edinburgh	Glasgow	Leeds/Bradford	Manchester	Newcastle
London Heathrow Services	Point to Point	Leisure	48%	41%	35%	38%	19%	28%	14%
	London (Central)	Business	36%	47%	34%	38%	26%	8%	17%
	Point to Point	Leisure	46%	47%	61%	58%	56%	54%	72%
	London (West)	Business	48%	40%	61%	57%	61%	83%	79%
	Point to Point	Leisure	5%	3%	3%	0%	8%	13%	10%
	London (NE)	Business	9%	4%	1%	2%	12%	8%	5%
	Point to Point	Leisure	1%	8%	1%	4%	16%	5%	3%
	London (SE)	Business	8%	9%	3%	3%	1%	0%	0%
Other London Services	Point to Point	Leisure	37%	50%	25%	21%	0%	0%	5%
	London (Central)	Business	30%	62%	48%	38%	11%	11%	5%
	Point to Point	Leisure	24%	17%	13%	13%	12%	12%	19%
	London (West)	Business	9%	12%	11%	10%	16%	16%	16%
	Point to Point	Leisure	21%	31%	36%	34%	73%	73%	71%
	London (NE)	Business	34%	24%	23%	28%	73%	73%	78%
	Point to Point	Leisure	18%	2%	26%	32%	15%	15%	5%
	London (SE)	Business	27%	2%	17%	23%	0%	0%	1%

Source: 2013 CAA Survey/York Aviation

Growth Rates

Each of the market types has been projected forward in totality from each catchment area based on DfT growth rates, taken from their 2013 forecasts.

Although DfT has produced forecasts based on ten-year periods to 2050, our analysis is only concerned with 2050 and therefore the growth rates we have used are averages covering the whole period to 2050.

The growth rates applied can be seen on the right.

Applied Annual Growth Rates to 2050

Market Segment	Passenger Type	Growth Rate
Point to Point		
<i>Point to Point London (Central)</i>	Leisure	2.1%
	Business	2.1%
<i>Point to Point London (West)</i>	Leisure	2.1%
	Business	2.1%
<i>Point to Point London (NE)</i>	Leisure	2.1%
	Business	2.1%
<i>Point to Point London (SE)</i>	Leisure	2.1%
	Business	2.1%
Short Haul Hubbing Via London	Leisure	2.1%
	Business	2.2%
Long Haul Hubbing Via London	Leisure	2.2%
	Business	2.4%
Short Haul Point to Point	Leisure	2.1%
	Business	2.2%
Long Haul Point to Point	Leisure	2.2%
	Business	2.4%
Short Haul Hubbing Via Other	Leisure	2.1%
	Business	2.2%
Long Haul Hubbing Via Other	Leisure	2.2%
	Business	2.4%

Source: Department for
Transport

Market Capture Performance

We have made assumptions about the proportion of different elements of the market which would be captured by a service to the new hub. The following broad principles have been applied:

- **Point to Point to London Heathrow:** It is assumed that 100% of the market is captured by either existing or improved services to London Heathrow (where services exist currently) under the two and three-runway scenarios, and for the New Hub scenario, it is initially assumed that 100% of these passengers might switch to the new hub. However, we recognise that a new hub in the East of London may not be so attractive to those heading to the West of London and have thus made an adjustment to reflect some element of diversion back to rail or to other London airports as appropriate.
- **Point to Point to other London airports:** In the two Heathrow scenarios, where airports already have services to London Heathrow, it is assumed that there will be no shift in market capture for services to other London airports as passengers are assumed to already be selecting their best option route. It is assumed that a new hub may be more attractive to some of the passengers heading to North East and South East London, however, or to the whole of London where frequency increases will improve the service offer. Therefore, it is assumed that the new hub will penetrate some of the market currently flying to other airports. Where there are currently no services to London Heathrow, or where there are no services to London from the local airport, we have assumed that a larger proportion of passengers may switch to the new hub. We summarise the assumed market capture of the new hub from passengers currently flying to other London airports (excluding London Heathrow) below.

	Aberdeen, Edinburgh, Glasgow, Belfast	Manchester, Leeds/ Bradford, Durham, Liverpool, Cardiff, Humberside, Plymouth	Newcastle	Leeds/Bradford	Inverness	Dundee	Newquay
Area 1 - Central)	0%	0%	0%	0%	20%	0%	100%
Area 2 - West	0%	0%	0%	0%	20%	0%	100%
Area 3 - SE	10%	0%	30%	0%	20%	0%	100%
Area 4 - NE	10%	0%	30%	0%	20%	0%	100%
Notes:		Currently no other London air passengers	Improved frequency should see greater market capture	Currently no other London air passengers	Current limited offer would be likely to see capture of some passengers for all London areas	Current high leakage of demand to EDI should sustain a new hub service in addition to the retention of the current limited offer.	Low overall demand would require suspension of the existing service so air passengers would have to use the new hub

The remaining market types are continued overleaf.

Market Capture Performance (2)

- **Short haul hubbing through London airports:** Although there is currently some limited hubbing through airports other than Heathrow in London, it is assumed that the range and convenience of connections offered by a new hub would capture 100% of this market.
- **Long haul hubbing through London airports:** As with short haul hubbing through London, the range and convenience of connections from a new hub would be expected to capture 100% of this existing market.
- **Short Haul direct:** Although hub services from a local airport may be more attractive than some surface journeys to access point to point flights, we have not assumed any capture of the direct market on the basis that direct services, even from a neighbouring airport, are likely to remain more attractive than a connecting service.
- **Long Haul direct:** Although hub services from a local airport may be more attractive than some surface journeys to access point to point flights, we have not assumed any capture of the direct market on the basis that direct services, even from a neighbouring airport, are likely to remain more attractive than a connecting service.
- **Short haul hubbing through non-London airports:** Where airports already have services to London Heathrow, it is assumed that they will not gain further market from existing hub services. Where an airport currently has no link to London Heathrow, it is assumed that it will gain some market share from existing hub services (either from the local airport or neighbouring airports) in line with the overall division of the market seen at comparator airports. The comparators are the same as those shown on slide 21 of the main report.
- **Long haul hubbing through non-London airports:** This is as above for short haul hubbing and is included in the table below.

Assumed Market Capture by the New Hub Routes of Existing Non-London Hub Markets

Market Type	1	2	3	4
Comparator Example	Scotland. Average of Glasgow, Edinburgh and Aberdeen	Newcastle	Manchester	Northern Ireland
Short haul leisure	5.6%	1.9%	0.3%	4.2%
Short haul business	12.4%	11.1%	4.5%	30.8%
Long haul leisure	41.2%	30.4%	9.4%	30.9%
Long haul business	43.7%	33.6%	22.4%	61.2%

Stimulation (1)

Stimulation in the context of the route forecasts refers to the effect by which additional demand is induced to travel by the existence of the new route. This is over and above the underlying growth in demand that is included within the growth rates set out above. This demand is deemed to be induced by a new route where that route results in improved accessibility to the end destination, in this case London or the final destination to which the passenger is travelling. Accessibility could be measured in a number of ways but here we have used as the basis for considering stimulation:

- passenger journey times on the new service compared to the best existing routing;
- the additional frequency of service offered by the new service above the existing base offered by air or rail services.

For passengers travelling between the regional airport and London (point to point passengers), we have:

- compared the travel time on the new service to each of the four London zones previously identified to the best available alternative option in 2050, allowing for HS2 for rail travel;
- where this indicates that journey times will be reduced, we have assumed that the percentage reduction in journey time reflects a reduction in the generalised cost facing the passenger;
- a price elasticity of -0.3 for business travellers and -0.7 for leisure travellers is then applied to identify the % increase in demand resulting from this reduction in cost;
- we have then considered the increase in frequency of service to London (both air and rail) resulting from the new service and calculated the percentage change in wait times resulting from the new service using the Department for Transport formula for assessing air journey wait times associated with flight frequency;
- again, the resulting percentage change in wait time is assumed to represent a change in the generalised cost facing the passenger and the same price elasticities are applied to calculate the percentage increase in demand associated with the reduction in generalised cost.

For passengers hubbing in London, we have taken a similar approach to assessing stimulation:

- at the outset we have assumed that if there is an existing hub service from the airport there will be no significant stimulatory effect. Most destinations will be reachable and assessing any change in access time would be very difficult;
- however, where no current hub service exists, there is likely to be a significant change in accessibility (travel time) for passengers travelling to / from the airport. Here we have assumed that a passenger's journey time will improve by the difference in journey time from the relevant city centre to the local airport compared to the journey time to the next nearest airport with a hub service. A further allowance is then made for the air travel time (separated between short haul and long haul travellers) so that the journey time facing the passenger is reflective of their whole journey from origin to destination;
- the percentage change is then calculated and the price elasticities above applied again to identify the appropriate level of stimulation.

Stimulation (2)

The resulting stimulation rates for each market are shown in the table below for point to point and onward connecting travel.

City / Destination	London Zone	Point to Point		Onward	
		Business	Leisure	Business	Leisure
Aberdeen	Central	0%	0%	0%	0%
Aberdeen	West	0%	0%	0%	0%
Aberdeen	South East	5%	11%	0%	0%
Aberdeen	North East	5%	11%	0%	0%
Edinburgh	Central	0%	0%	0%	0%
Edinburgh	West	0%	0%	0%	0%
Edinburgh	South East	5%	12%	0%	0%
Edinburgh	North East	5%	12%	0%	0%
Glasgow	Central	1%	2%	0%	0%
Glasgow	West	1%	2%	0%	0%
Glasgow	South East	6%	14%	0%	0%
Glasgow	North East	6%	14%	0%	0%
Belfast	Central	2%	6%	0%	0%
Belfast	West	2%	6%	0%	0%
Belfast	South East	7%	16%	0%	0%
Belfast	North East	7%	16%	0%	0%
Newcastle	Central	3%	7%	0%	0%
Newcastle	West	3%	7%	0%	0%
Newcastle	South East	8%	19%	0%	0%
Newcastle	North East	8%	19%	0%	0%
Manchester	Central	0%	0%	0%	0%
Manchester	West	0%	0%	0%	0%
Manchester	South East	0%	0%	0%	0%
Manchester	North East	0%	0%	0%	0%
Leeds Bradford	Central	5%	13%	0%	0%
Leeds Bradford	West	5%	13%	0%	0%
Leeds Bradford	South East	5%	13%	0%	0%
Leeds Bradford	North East	5%	13%	0%	0%
Inverness	Central	4%	14%	5%	11%
Inverness	West	4%	14%	5%	11%
Inverness	South East	4%	14%	5%	11%
Inverness	North East	9%	24%	5%	11%
Dundee	Central	4%	12%	2%	6%
Dundee	West	4%	12%	2%	6%
Dundee	South East	9%	24%	2%	6%
Dundee	North East	4%	12%	2%	6%

Stimulation (3)

City / Destination	London Zone	Point to Point		Onward	
		Business	Leisure	Business	Leisure
Durham Tees Valley	Central	4%	9%	0%	0%
Durham Tees Valley	West	3%	8%	0%	0%
Durham Tees Valley	South East	8%	20%	0%	0%
Durham Tees Valley	North East	8%	20%	0%	0%
Liverpool	Central	3%	8%	1%	2%
Liverpool	West	3%	8%	1%	2%
Liverpool	South East	3%	8%	1%	2%
Liverpool	North East	3%	8%	1%	2%
Cardiff	Central	2%	5%	0%	0%
Cardiff	West	2%	5%	0%	0%
Cardiff	South East	7%	17%	0%	0%
Cardiff	North East	7%	17%	0%	0%
Plymouth	Central	5%	13%	4%	9%
Plymouth	West	5%	13%	4%	9%
Plymouth	South East	5%	13%	4%	9%
Plymouth	North East	11%	26%	4%	9%
Newquay	Central	5%	13%	4%	9%
Newquay	West	5%	13%	4%	9%
Newquay	South East	5%	13%	4%	9%
Newquay	North East	11%	26%	4%	9%
Humberside	Central	12%	30%	0%	0%
Humberside	West	11%	27%	0%	0%
Humberside	South East	16%	39%	0%	0%
Humberside	North East	16%	39%	0%	0%

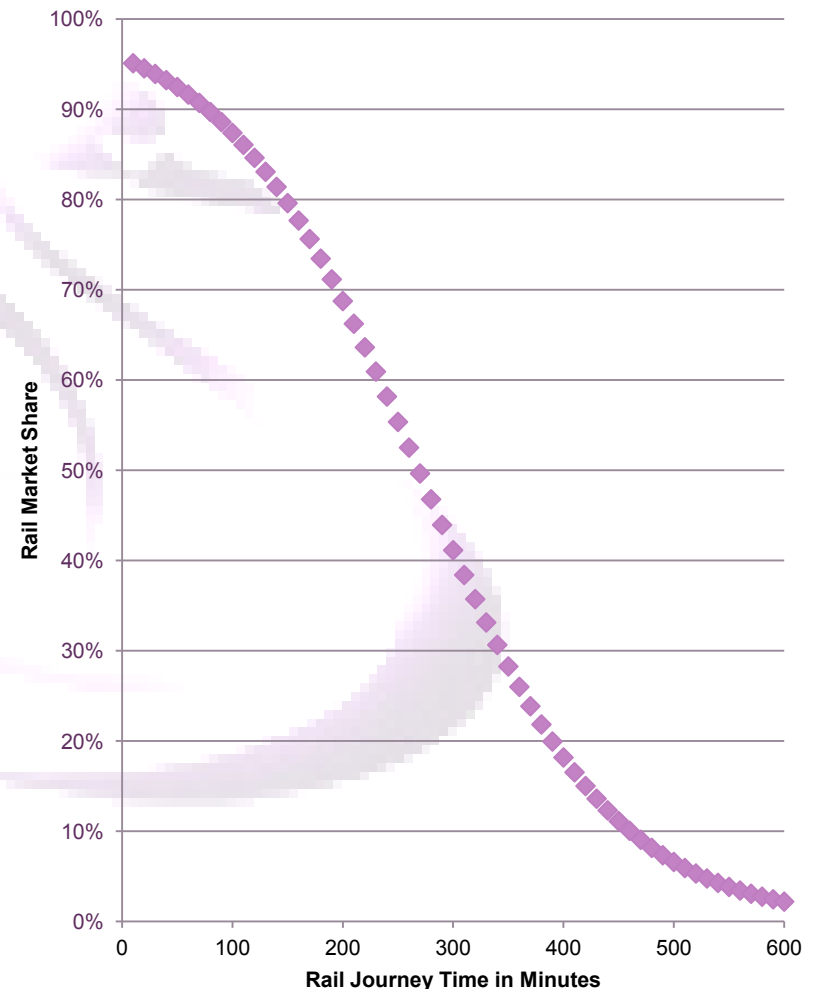
Rail Diversion

The issue of the potential impact of changes in the pattern of domestic air services to London on rail travel and vice versa is a complex issue. Clearly, new air services will have ability to take traffic from rail services and equally HS2 will change the competitive balance between rail and air on existing routes.

At the same time, the available data on domestic rail travel patterns is weak. The Office of the Rail Regulator publishes some information but its level of detail on regional flows is low. As a result, throughout this report we have had to make estimates about rail usage. The same applies in relation to rail diversion.

Ultimately, we have made judgemental adjustments to our air traffic forecasts to reflect the influence of rail competition. However, to assist us in making these adjustments and particularly in assessing the potential for new routes, we have undertaken an analysis of the extent of rail market share on London routes and the influence of travel time on that position. The resulting S-curve relationship is shown opposite. It should be emphasised that there are relatively few data points to be assessed as the quality of the data on rail travel is poor. As a result the statistical strength of the relationship is limited. However, it does provide some basis for making adjustments to our forecasts on a market by market basis.

Rail Market Share vs. Rail Journey Time



Route Viability

Our route forecasts have been derived taking into account expected viability thresholds for the airlines.

To sustain a hub connecting service is likely to require at least 3 services per day in order to be attractive for both point to point and hubbing passengers. With a 100-seat aircraft, this is likely to require at least 185,000 passengers per annum.

Viability is not solely based on overall passenger numbers however, but also reflects the required mix of passengers on the route to make it financially sustainable for the carriers.

For connecting passengers, the fares are typically divided pro-rata by the length of each leg of the journey, and thus passengers using a service to connect to another route may not generate much income for the carrier. As a consequence, it is unlikely that any domestic service would be sustainable with 100% hubbing passengers and no underlying point to point demand.

Hence each route is likely to need a balance of point to point, short haul connecting and long haul connecting passengers, to allow the carrier to maximise both overall passenger volumes and also the yield and income they achieve from each passenger.

Our route viability assessment therefore uses the balance on existing services as a guide for the likely requirements of carriers in the future:

- the existing balance of passengers is assumed to remain on current services;
- for new routes to London, it is assumed that the balance will be similar to other comparators, based broadly on proximity to London.

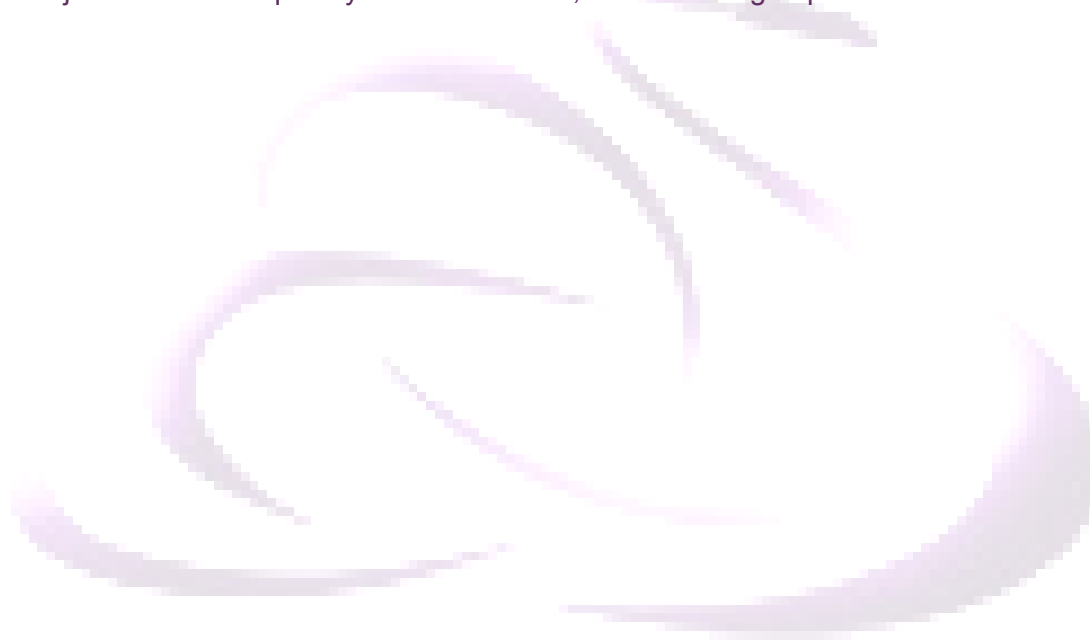
Passenger Market Balance Viability Requirements

Market Type	1	2	3	4
Existing Example	Scotland. Average of Glasgow, Edinburgh and Aberdeen	Newcastle	Manchester	Northern Ireland
Point to Point %	57%	27%	30%	59%
Short Haul Hubbing %	12%	17%	16%	12%
Long Haul Hubbing %	31%	56%	54%	29%
Market Characteristics	Relatively peripheral location, with rail services available but with less attractive rail journey times.	Closer to London with improved rail journey times which will make rail more attractive. Likely to be increasingly reliant on Long Haul connections.	Closer to London again. Rail services for all but West London likely to be faster than travel by air. Likely to be increasingly reliant on Long Haul connections.	No direct rail services, leaving air travel as the fastest route to London compared to alternative multi-mode travel by sea and rail.
Comparator For	Inverness, Dundee, Newquay	Durham, Plymouth	Liverpool, Cardiff	City of Derry

The existing passenger profile can be seen opposite and some examples of the ways in which these have been applied is highlighted.

Route Viability (2)

Having gone through each of the forecast stages, where a route was not able to offer sufficient passengers to meet the passenger mix viability criteria, it could have either the aircraft size or frequency reduced until such points as a service of at least three flights per day could meet the criteria, or otherwise the service was deemed unviable and not carried forward into the economic assessment, despite making it through the original sift process. City of Derry was one example of a route which could not provide sufficient passengers for the market mix criteria (insufficient long haul passengers) and was therefore dropped from the assessment. Based on adjustments to frequency and aircraft size, the remaining airports were all deemed to provide a viable mix of traffic by 2050.



Oxford Economics Report



OXFORD ECONOMICS

A new hub airport for London - Regional economic impacts of improved connectivity

**A report for Transport for London
April 2014**



**OXFORD
ECONOMICS**

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Executive Summary

The key objective of this study is to assess the long term regional economic impacts within the UK of improved connectivity arising from the development of a new hub airport for London. In particular, the study focuses on the long term effects of such a new hub on Gross Value Added (GVA) in 15 key UK regional cities by the year 2050.

This work builds on Oxford Economics' past modelling of the long run effects of improvements in air connectivity and its recent work for Transport for London on A new hub airport for the UK.

While these results are intended to be illustrative, in total it is estimated that the development of a London hub airport will provide £2,226 million (in £ 2010 terms) in additional GVA to the 15 cities of interest. Rising GVA implies, among other things, increases in local living standards and in wages.

Table ES1 summarises the results for each of the 15 cities below. All figures are presented in real terms (£2010).

Table ES1: GVA impacts of new London hub – selected cities

City	Impact on GVA 2050 (£m 2010)
Aberdeen	335
Edinburgh	437
Glasgow	346
Belfast	89
Newcastle	62
Manchester	64
Leeds/Bradford	100
Highlands (Inverness)	64
Dundee	135
Durham/Middleborough	213
Liverpool	116
Cardiff	54
Restormel (Newquay)	32
Plymouth	32
Hull	146
Total	2,226

NB: Numbers may not add precisely to total due to rounding.

1 Introduction

The key objective of this study is to assess the long term regional economic impacts within the UK of improved connectivity arising from the development of a new hub airport for London. In particular, the study focuses on the long term effects of such a new hub on Gross Value Added (GVA) in 15 key UK regional cities by the year 2050¹.

This work builds on Oxford Economics' past modelling of the long run effects of improvements in air connectivity and its recent work for Transport for London on A new hub airport for the UK.²

This report is organised as follows:

- Section 2 provides background economic overviews of the 15 regional cities in 2014 as well as economic projections for 2050.
- Section 3 provides an indicative estimate of how the connectivity benefits arising from a new hub airport might benefit regional economies by 2050.

¹ GVA is equal to GDP at basic prices as opposed to GDP at market prices which is often given in official statistics.

² See <http://www.tfl.gov.uk/corporate/about-tfl/how-we-work/planning-for-the-future/a-new-hub-airport-for-the-uk?cid=fs124> In particular this work draws on the methodology detailed in Oxford Economics (2013) *Impacts on the UK Economy through provision of International Connectivity*

2 Summary of background regional indicators - 2050

2.1 Overview

As a background to understanding how the proposed new hub for London will impact on regional economies, Oxford Economics has produced overviews of key regional economic statistics for 15 cities (as defined by relevant central local authority districts) covered by this report³. Each of these cities has a regional airport within or close to its boundaries. (In cases where two cities share an airport, such as Leeds Bradford Airport data for both cities are provided). These data cover

- Current (2014) and forecast (2050) employment, population and GVA.
- Current and forecast employment by industry.
- Current location quotients (LQs).⁴
- Employment and GVA growth 2014 -2050 in aggregate and by key industry.

The 15 regional cities examined in this study are:

- Aberdeen
- Edinburgh
- Glasgow
- Belfast
- Newcastle
- Manchester
- Leeds/Bradford
- Highlands (Inverness)
- Dundee
- Durham/Middlesbrough
- Liverpool
- Cardiff
- Restormel (Newquay)
- Plymouth

³ Note that “cities” here are defined by the relevant local authority district that encompasses the city centre. This area will often be smaller than looser definitions of city size. For example, Manchester’s local authority district is estimated to have a population of 523,000 while a definition encompassing a number of local authorities in a “Greater Manchester” would be larger than this.

⁴ LQs provide an indication of the relative concentration of an industry within a given region as compared to the nation as a whole.

■ Hull

Summaries and commentary on each of these regional cities is provided in the text below.

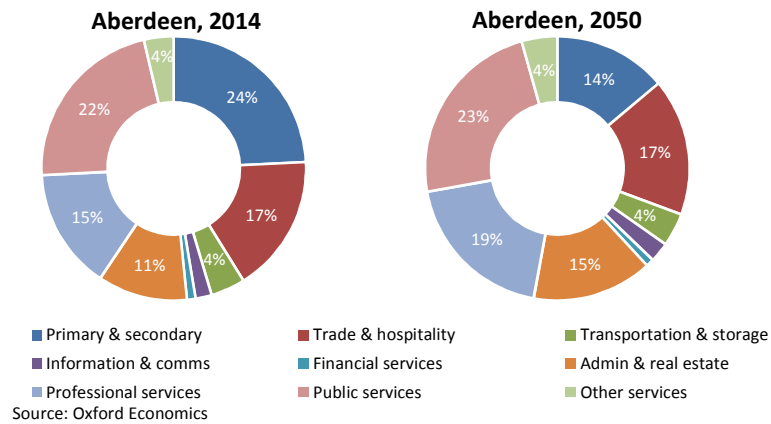
2.2 Aberdeen

Highlights

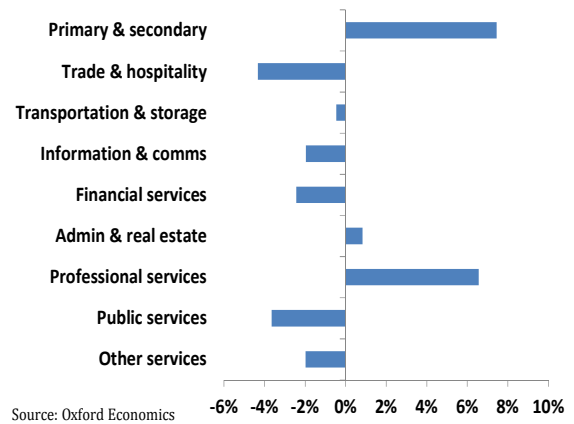
- Aberdeen's population for 2014 is estimated to be 227,000 of which 159,000 are of working age. Aberdeen's total employment for 2014 is estimated to be 197,000.
- The primary & secondary sector is the largest in Aberdeen, accounting for 48,000 jobs and 24% of employment. Public services are the next largest sector with 44,000 jobs contributing 22% to total employment.
- The primary and secondary sector is highly concentrated in Aberdeen, comprising 24% of employment compared to the UK average of 17%. Likewise, professional services have a large representation, accounting for 15% of jobs compared to the national average of 8%. Despite being Aberdeen's second largest sector, public services are under-represented in the city in comparison the national average of 26%.
- Aberdeen's population is expected to rise by 21,000 to 248,000 between 2014 and 2050. The population increase is equivalent to a 0.2% rise per annum, less than half the national growth rate of 0.5%. In the same period employment growth is predicted to be much lower, with the creation of 2,000 additional jobs. The weak employment forecast corresponds to a 0.1% rise each year, a quarter of the national average.
- Employment growth is driven by professional services and admin & real estate with the creation of 9,200 and 7,600 additional jobs respectively. This growth will help replace the expected loss of 20,100 jobs in the primary & secondary sector.
- Aberdeen's economic output is forecast to grow at an average rate of 2.0% per annum between 2014 and 2050, lagging behind UK growth of 2.5%. The expansion is expected to be led by professional services, adding £3.6bn to output growing at a rate of 3.5% per annum. Large rises in GVA are also predicted in the admin & real estate sectors, which are forecast to grow at 2.9% per year adding £2.7bn to output.

	Aberdeen			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	227	248	0.2	64,521	75,774	0.5
Employment (000's)	197	199	0.1	32,709	37,444	0.4
GVA (£m, 2010)	10,172	20,942	2.0	1,394,661	3,410,995	2.5

Economic structure

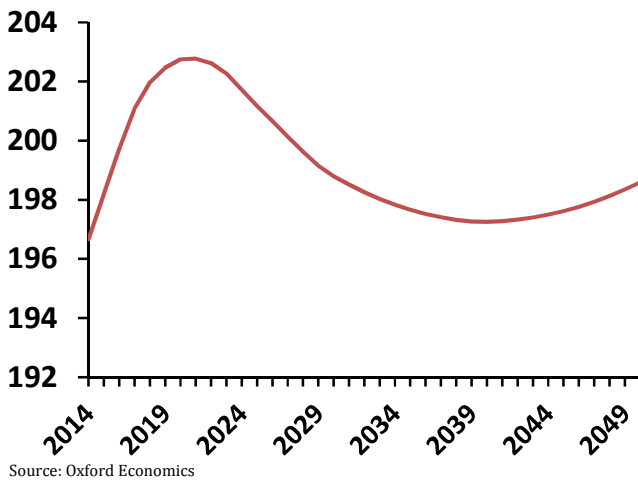


Location Quotient, Aberdeen v UK, 2014

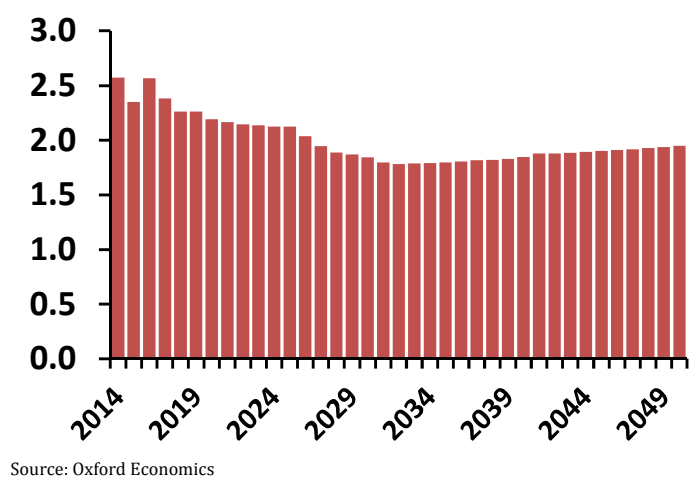


The outlook for Aberdeen

Employment (000s), 2014-50

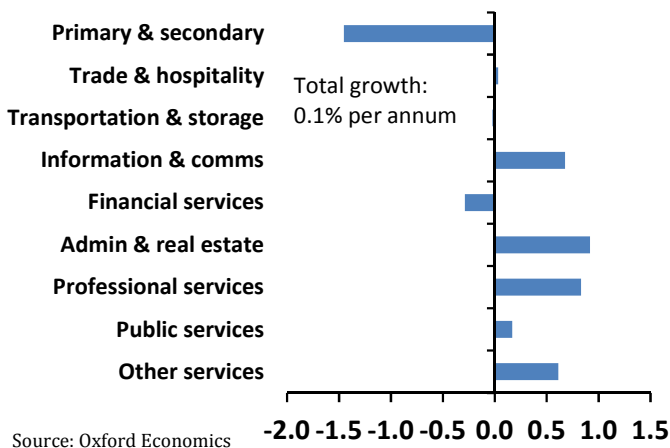


GVA growth (%), 2014-50

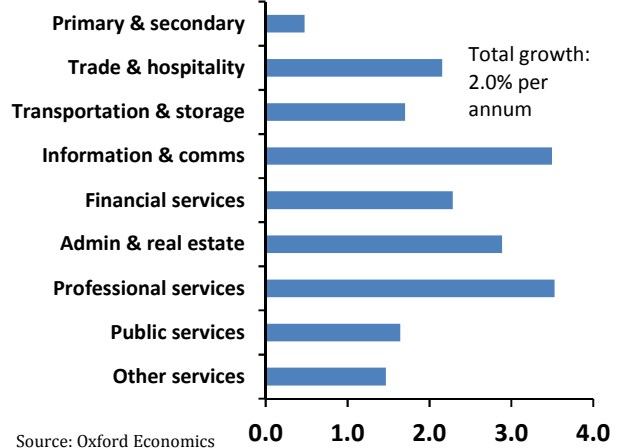


Which sectors will drive Aberdeen's growth?

Annual average employment growth 2014-50 (%/year)



Annual average GVA growth 2014-50 (%/year)



¹ Working age population is defined as all people aged 16-64 resident in the area

² Employment is workplace-based jobs

³ GVA output is based on £2010 constant prices

2.3 Edinburgh

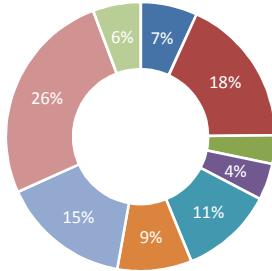
Highlights

- The total population of Edinburgh in 2014 is estimated to be 493,000 with a working age population of 343,000 people. Total employment in the city is estimated to be 370,000 jobs.
 - The public services sector is the largest in Edinburgh accounting for 96,000 jobs representing 26% of total employment. The second largest sector is trade and hospitality with 67,000 jobs accounting for 18% of total employment.
 - Accounting for 11% of jobs in city, the financial services sector is 8% more heavily concentrated in Edinburgh than in the UK. With a 15% share of employment, professional services are also heavily concentrated in Edinburgh, almost twice the national average.
 - Edinburgh's population is forecast to rise by 166,000 in the period to 2014-50 equivalent to an annual growth of 0.8%, stronger than the UK outlook. Strong employment growth underpins the expected population growth, with total employment estimated to reach 509,000 by 2050, an increase of 139,000 jobs since 2014.
- This equates to an annual growth rate of 0.9% over twice the national average (0.4%) during the same period.
- Professional services are forecast to grow the fastest in the period to 2050, generating 43,000 new jobs equivalent to a per annum rise of 1.6%. The second fastest growing sector is admin & real estate with an annual average growth rate of 1.5% in the period, creating 23,000 new jobs. As the largest sector public services will contribute to growth, probably over the long run, creating 26,000 additional jobs by 2050.
 - Edinburgh's output is expected to increase by £32bn in the period 2014 to 2050. The expansion in output is equivalent to 2.9% per annum, stronger than the UK average of 2.5%. The professional services sector is forecast to experience the strongest growth, expanding at 4.3% annually. Strong per annum GVA growth is also predicted in the information & communications sector with average rises of 3.9% per year.

	Edinburgh			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	493	659	0.8	64,521	75,774	0.5
Employment (000's)	370	509	0.9	32,709	37,444	0.4
GVA (£m, 2010)	17,551	49,566	2.9	1,394,661	3,410,995	2.5

Economic structure

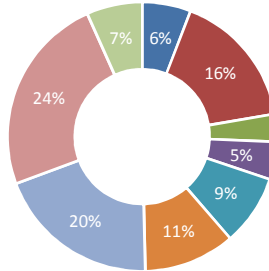
Edinburgh, 2014



Primary & secondary
Information & comms
Professional services
Trade & hospitality
Financial services
Public services

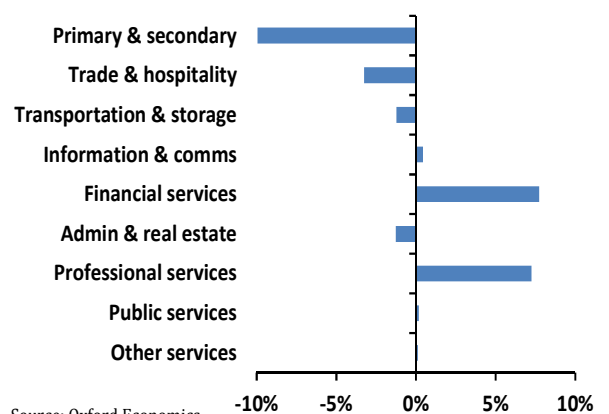
Source: Oxford Economics

Edinburgh, 2050



Transportation & storage
Admin & real estate
Other services

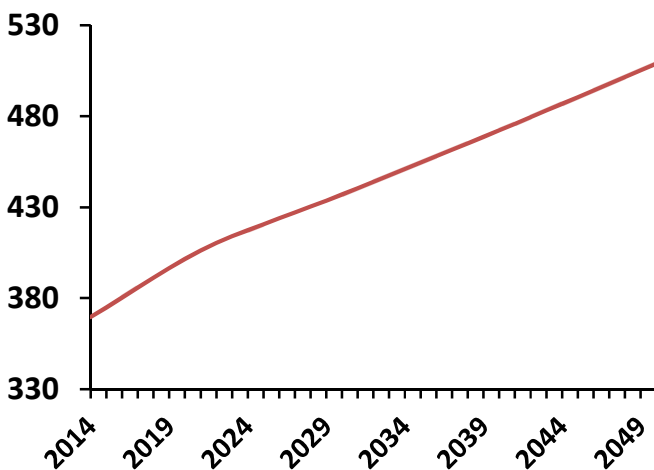
Location Quotient, Edinburgh v UK, 2014



Source: Oxford Economics

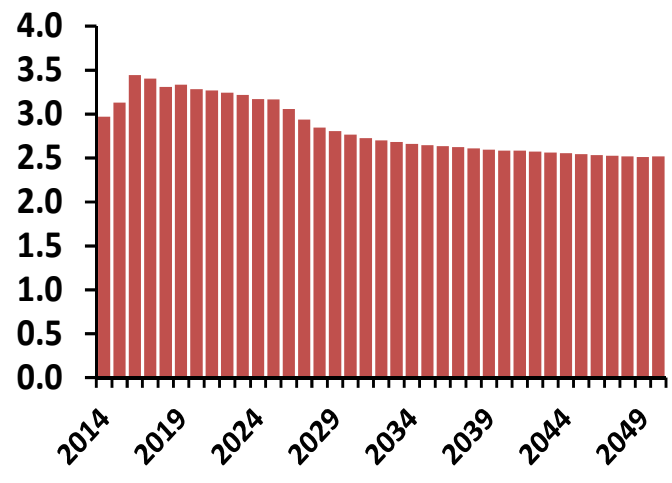
The outlook for Edinburgh

Employment (000s), 2014-50



Source: Oxford Economics

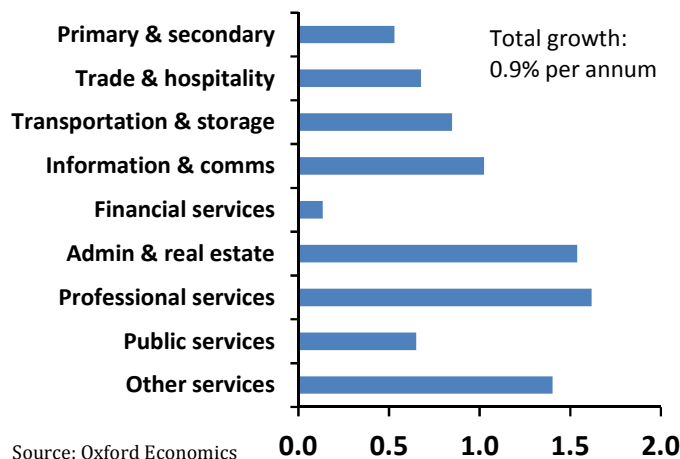
GVA growth (%), 2014-50



Source: Oxford Economics

Which sectors will drive Edinburgh's growth?

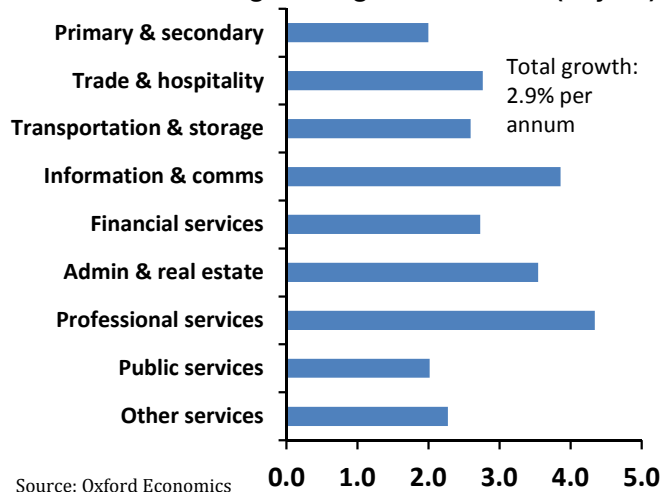
Annual average employment growth 2014-50 (%/year)



Source: Oxford Economics

Total growth:
0.9% per annum

Annual average GVA growth 2014-50 (%/year)



Source: Oxford Economics

Total growth:
2.9% per annum

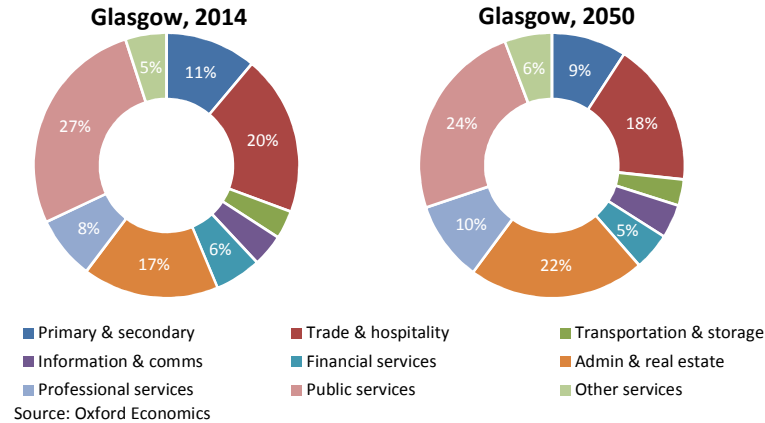
2.4 Glasgow

Highlights

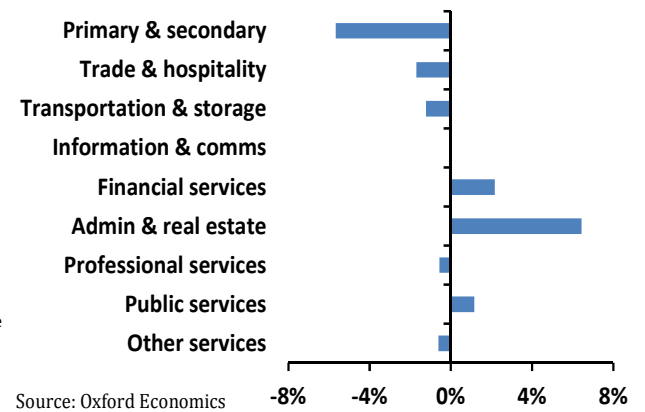
- The population of Glasgow in 2014 is estimated to be 598,000 with 417,000 people of working age. Total employment in Glasgow is currently estimated to be 419,000.
- The public services sector is currently the largest in Glasgow, with 113,000 jobs and accounting for 27% of total employment. The second largest sector is trade and hospitality with 82,000 jobs making up one in every five jobs.
- Accounting for 17% of jobs in city, the admin & real estate sector is more heavily concentrated in Glasgow with a 6 ppd⁴ to the UK. As Glasgow is a more urban city the primary and secondary sector is underrepresented accounting for only 11% of total employment.
- Glasgow's population is forecast to reach 680,000 by 2050, increasing by 82,000 and representing an annual rise of 0.4%. Just shy of the national average of 0.5%.
- Employment is forecast to grow at an annual rate of 0.5% to 2050, this is marginally stronger than the annual growth expected nationally (0.4%). The employment outlook suggests the creation of an additional 83,000 jobs over the period with total employment expected to reach 502,000 by 2050.
- Growth will be driven by admin & real estate, generating 39,000 new jobs representing an annual average growth rate of 1.3%. Professional services are also forecast to enjoy strong growth creating 17,000 new jobs, equivalent to annual growth of 1.2% per annum to 2050.
- GVA is forecast to grow by 2.6% per annum in the period to 2050 with the addition of £28bn to output, representing marginally stronger economic growth than the UK average of 2.5%. The fastest growth rates are predicted in the professional services and information & communications sectors, growing at 3.9% and 3.5% respectively. The admin & real estate sector is expected to add approximately £10bn to output in the period 2014-50, growing by 3.3% per annum.

	Glasgow			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	598	680	0.4	64,521	75,774	0.5
Employment (000's)	419	502	0.5	32,709	37,444	0.4
GVA (£m, 2010)	18,283	46,028	2.6	1,394,661	3,410,995	2.5

Economic structure

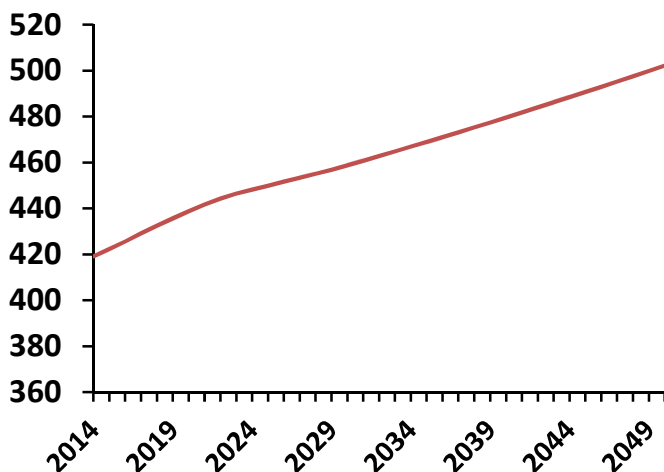


Location Quotient, Glasgow v UK, 2014

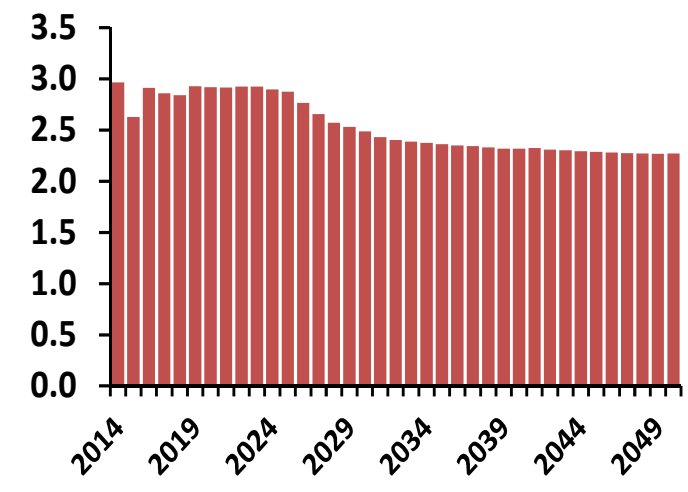


The outlook for Glasgow

Employment (000s), 2014-50

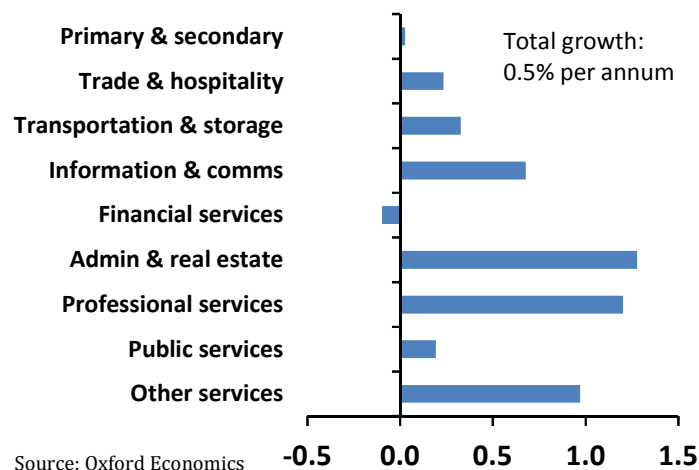


GVA growth (%), 2014-50

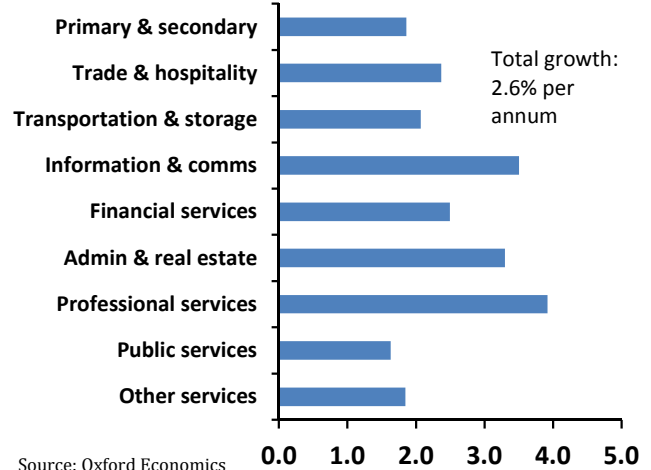


Which sectors will drive Glasgow's growth?

Annual average employment growth 2014-50 (%/year)



Annual average GVA growth 2014-50 (%/year)



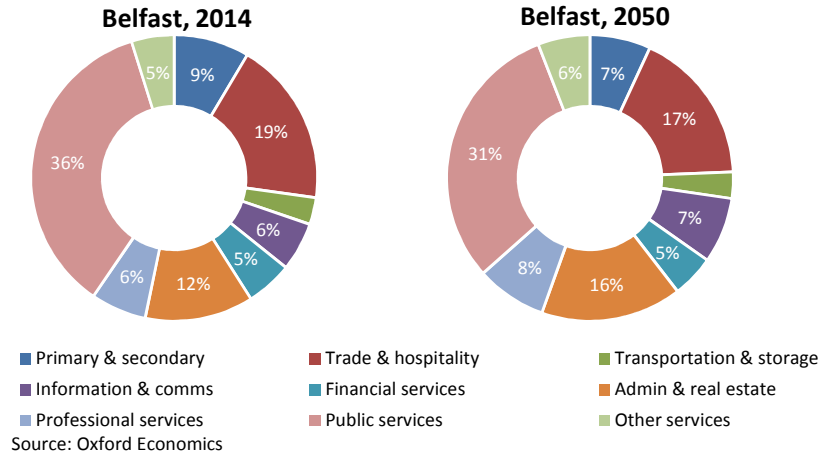
2.5 Belfast

Highlights

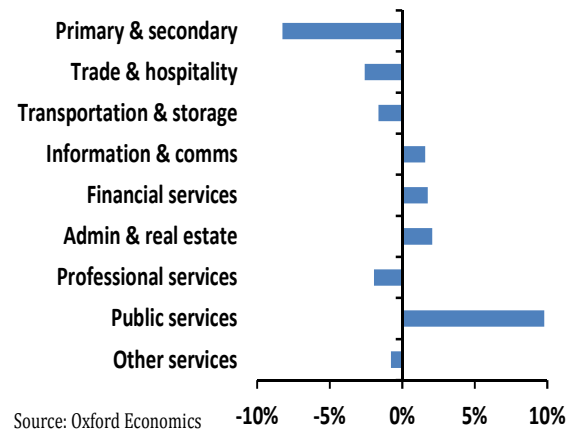
- The total population of Belfast in 2014 is estimated to be 283,000 with 183,000 people of working age. Total employment in 2014 is expected to be 217,000.
- The public services sector is the largest sector in Belfast, accounting for over 77,000 jobs and representing 36% of total employment. The next largest sector is the trade and hospitality sector which supports over 40,000 jobs in the city.
- The public services sector is heavily concentrated in Belfast, having a 10ppd to the UK average of 26%. The primary and secondary sector is under-represented in the city, accounting for just 9% of total employment.
- Belfast is forecast to experience weak population growth of 0.1% per annum in the period from 2014 to 2050, lagging behind the national average of 0.5%. Thus population is expected to increase population by 15,000, reaching 298,000 by 2050.
- Employment is expected to rise by almost 29,000 in the period, reaching 245,000 by 2050. The rise in employment is equal to growth of 0.4%, equal to the UK average.
- Expansion within admin & real estate will underpin job creation, generating 12,500 new jobs growing at a rate of 1.1% per annum. The primary & secondary and public services sectors are expected to marginally contract over the period, each expected to lose 2,000 jobs.
- GVA in Belfast is forecast to rise by £12.4bn in the period to 2050, representing an annual average growth rate of 2.4% marginally lagging the national average of 2.5%. Admin & real estate is predicted to underpin output increasing by £3.2bn in the period to 2050, growing at an average rate of 2.9% annually. Information & communications is expected to expand the fastest, growing annually by 4.0%, adding £1.7bn to output.

	Belfast			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	283	298	0.1	64,521	75,774	0.5
Employment (000's)	217	245	0.4	32,709	37,444	0.4
GVA (£m, 2010)	9,236	21,626	2.4	1,394,661	3,410,995	2.5

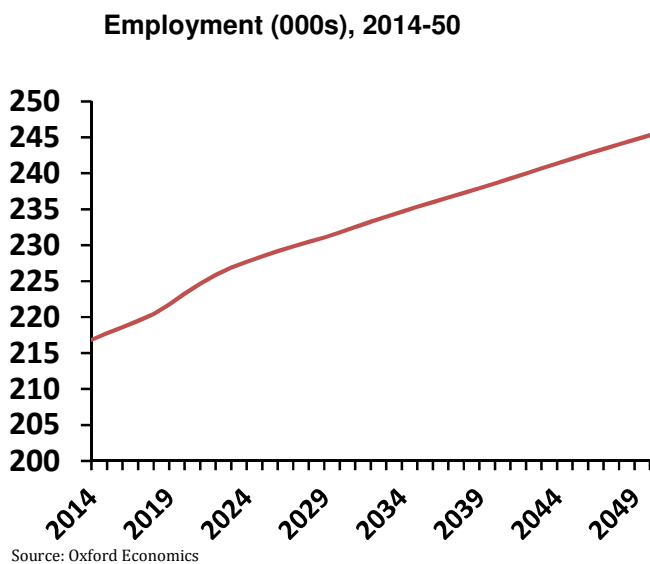
Economic structure



Location Quotient, Belfast v UK, 2014



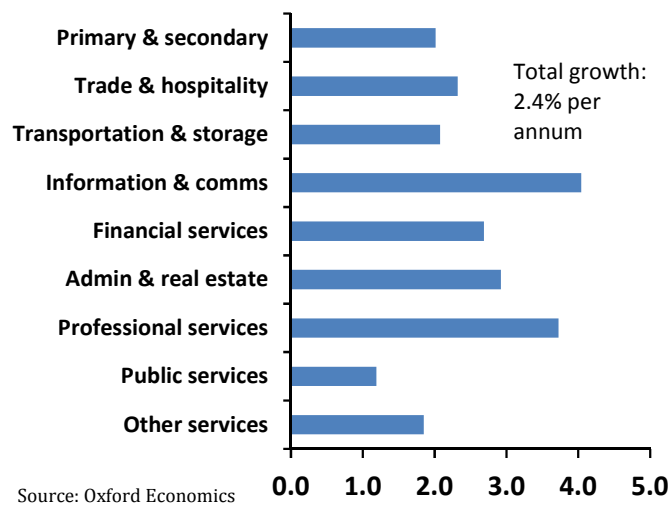
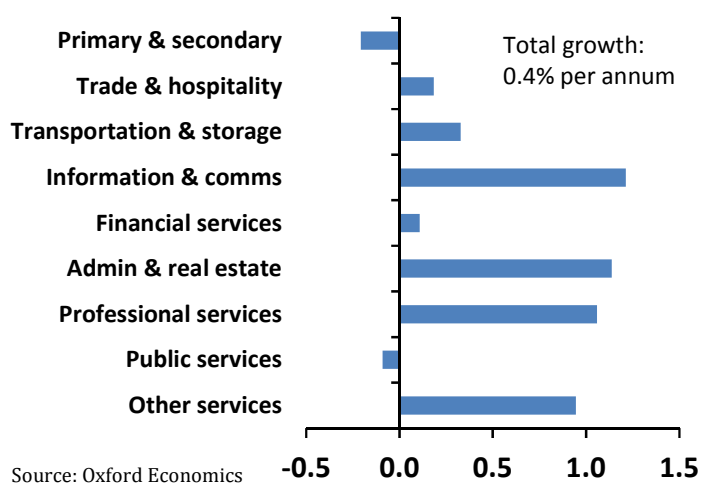
The outlook for Belfast



Which sectors will drive Belfast's growth?

Annual average employment growth 2014-50 (%/year)

Annual average GVA growth 2014-50 (%/year)



2.6 Newcastle-Upon-Tyne

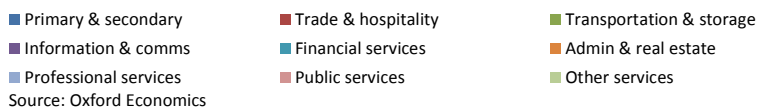
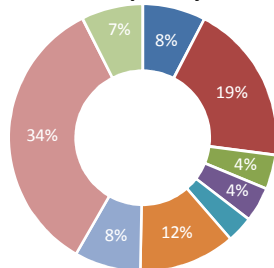
Highlights

- The population of Newcastle in 2014 is estimated to be 285,000 with 191,000 people of working age. Total employment in Newcastle is currently estimated to be 197,600.
- The public services sector is the largest in Newcastle in 2014. The sector contributes 67,700 jobs to the economy which equates to 34% of total employment. The trade and hospitality sector is the next largest source of employment in the area, accounting for 19% of total employment.
- Accounting for 34% of jobs in area, the public services sector is more heavily concentrated in Newcastle than the UK with the sector contributing 6% more to total employment in Newcastle. Given the urban setting of the city, it follows that the primary and secondary sector is less concentrated than across the UK as a whole, contributing just 8% to total employment in the city.
- The total population of Newcastle is forecast to reach 315,000 by 2050, equivalent to an annual average growth rate of just 0.3%. This level of growth places Newcastle behind the UK which is expected to grow by 0.5% annually over the same period.
- Employment growth in Newcastle is estimated to equal the national average, with an annual growth rate of 0.4% forecast during the period from 2014 to 2050.
- Newcastle's employment outlook is expected to be led by gains in the admin & real estate and professional services sectors, which are estimated to create 9,000 and 5,000 new jobs respectively by 2050. Growth in these sectors will serve to negate job losses expected in the primary & secondary, financial services and public services sectors over the same period.
- GVA in Newcastle is expected to reach £16.9bn by 2050, representing an annual growth rate of 2.4% which places the city marginally behind our national expectations (2.5%). GVA growth in the city will be predominantly under-pinned by gains in the information & communications, admin & real estate and professional services sectors, which are all expected to grow annually by over 3% across the forecast period.

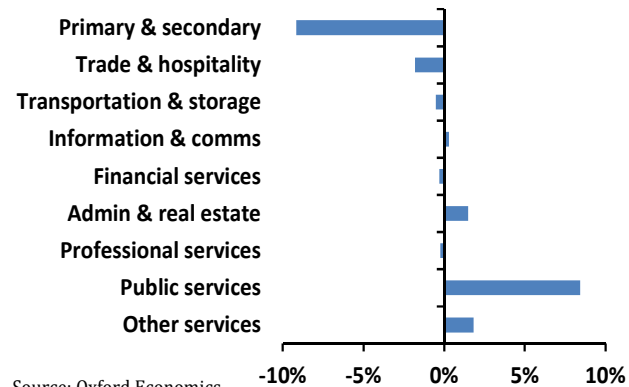
	Newcastle-Upon-Tyne			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	285	315	0.3	64,521	75,774	0.5
Employment (000's)	198	221	0.4	32,709	37,444	0.4
GVA (£m, 2010)	7,341	16,881	2.4	1,394,661	3,410,995	2.5

Economic structure

Newcastle-upon-Tyne, 2014



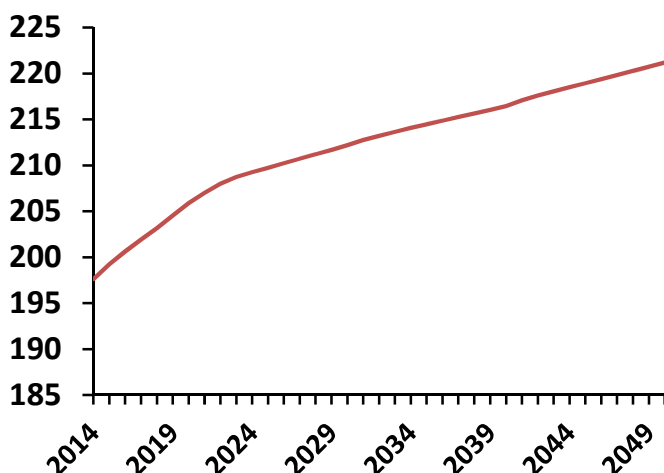
Location Quotient, Newcastle v UK, 2014



Source: Oxford Economics

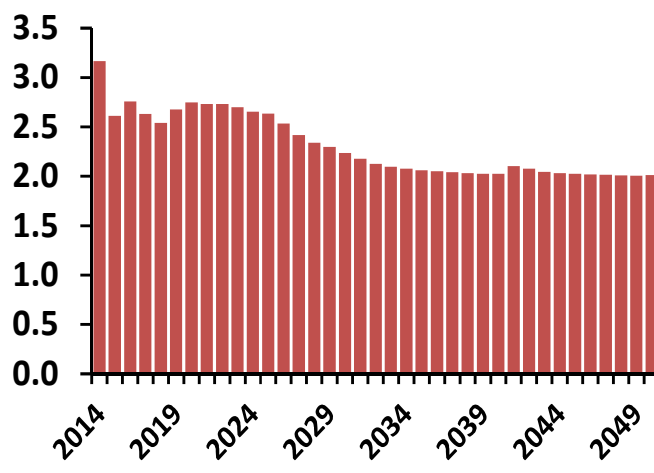
The outlook for Newcastle

Employment (000s), 2014-50



Source: Oxford Economics

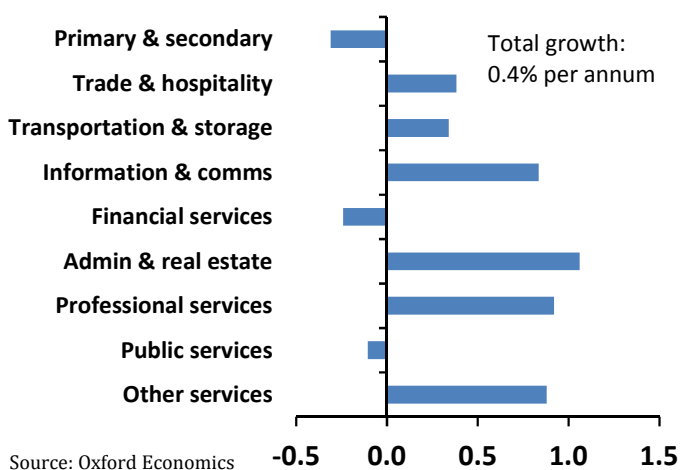
GVA growth (%), 2014-50



Source: Oxford Economics

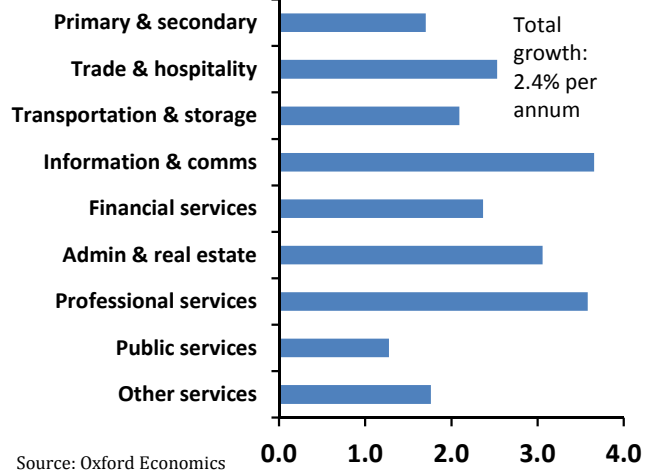
Which sectors will drive Newcastle's growth?

Annual average employment growth 2014-50 (%/year)



Source: Oxford Economics

Annual average GVA growth 2014-50 (%/year)



Source: Oxford Economics

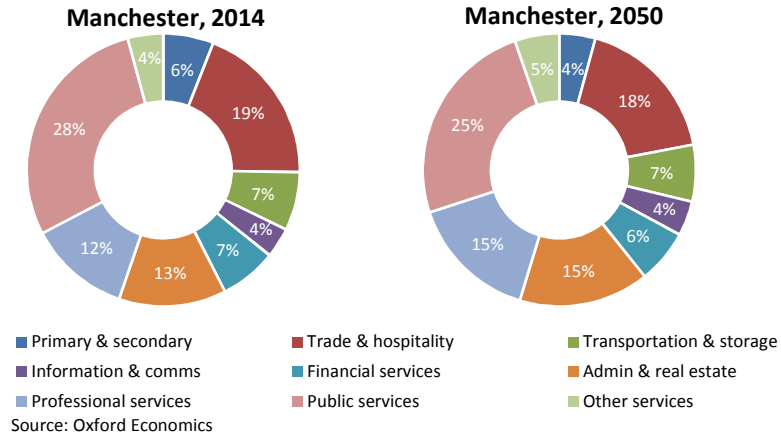
2.7 Manchester

Highlights

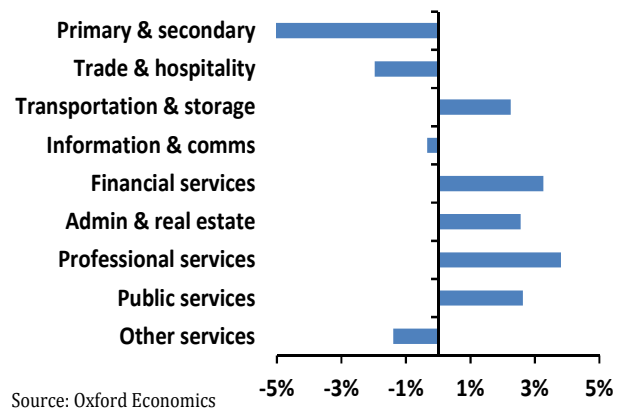
- The current population of Manchester is estimated to be 523,000, with 368,000 people of working age. The total employment level of Manchester is currently estimated to be around 354,000.
- The public services sector is the largest in Manchester, accounting for over 100,000 jobs and 28% of all employment in the city. The trade and hospitality sector is the next largest sector, contributing 19% to the total employment level.
- When compared with the sectoral structure of the UK Manchester's labour market is skewed towards the professional services, admin & real estate and financial services sectors. The primary and secondary sector is less concentrated in Manchester, with an 11ppd to the UK with this sector only contributing 6% of total employment in Manchester.
- Population growth in Manchester during the period from 2014 to 2050 is expected to surpass the UK average. Annual average growth of 0.6% is forecast in Manchester, compared with 0.5% in the UK. This level of growth is predicted to increase the population of the city by 123,000 bringing the total population of Manchester to 643,000 by 2050.
- Manchester's strong population outlook is largely dependent upon its strong labour market outlook. Total employment in Manchester is forecast to grow to 425,000 by 2050; this level of growth is equivalent to an annual average growth rate of 0.5%, stronger than the 0.4% expected across the UK as a whole.
- Sectorally the professional services and admin & real estate sectors are set to enjoy the highest levels of growth, with these two sectors expected to generate 22,000 and 21,000 jobs respectively by 2050. The primary and secondary sector by contrast is predicted to contract over the forecast period, with a total of 2,900 job losses estimated.
- GVA growth in Manchester is forecast to surpass that at the national level over the period 2014-2050, with an annual average growth rate of 2.8% expected. This level of growth would bring total GVA in Manchester to £39.5bn by 2050, some £24.6bn higher than current levels. As with employment, GVA growth will be driven predominantly by gains in the professional services and admin & real estate sectors.

	Manchester			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	523	643	0.6	64,521	75,774	0.5
Employment (000's)	354	425	0.5	32,709	37,444	0.4
GVA (£m, 2010)	14,924	39,518	2.8	1,394,661	3,410,995	2.5

Economic structure

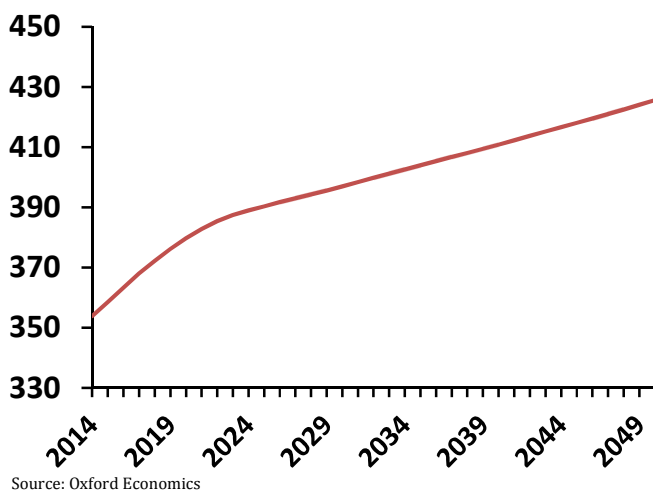


Location Quotient, Manchester v UK, 2014

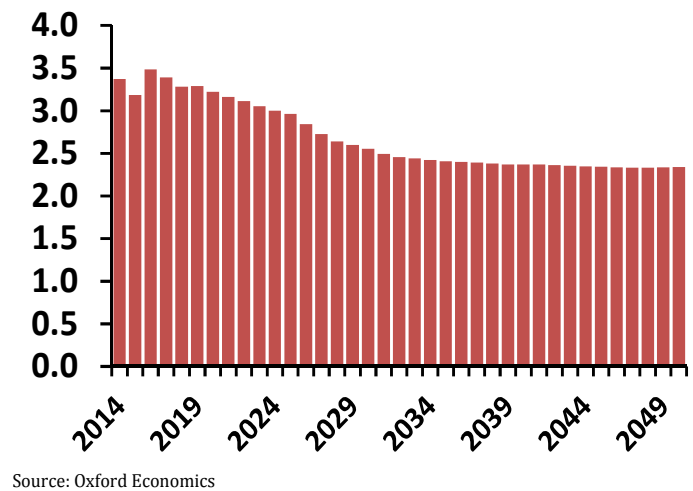


The outlook for Manchester

Employment (000s), 2014-50

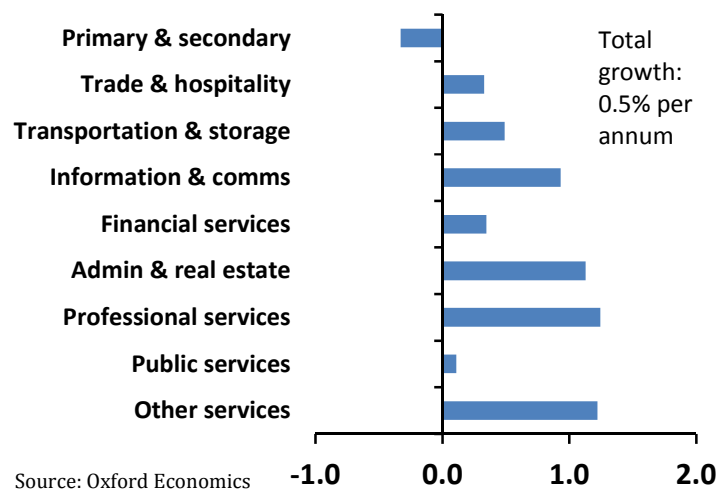


GVA growth (%), 2014-50

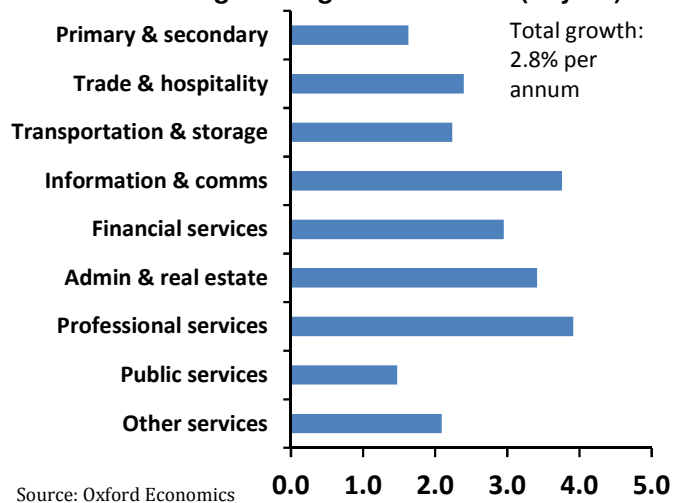


Which sectors will drive Manchester's growth?

Annual average employment growth 2014-50 (%/year)



Annual average GVA growth 2014-50 (%/year)



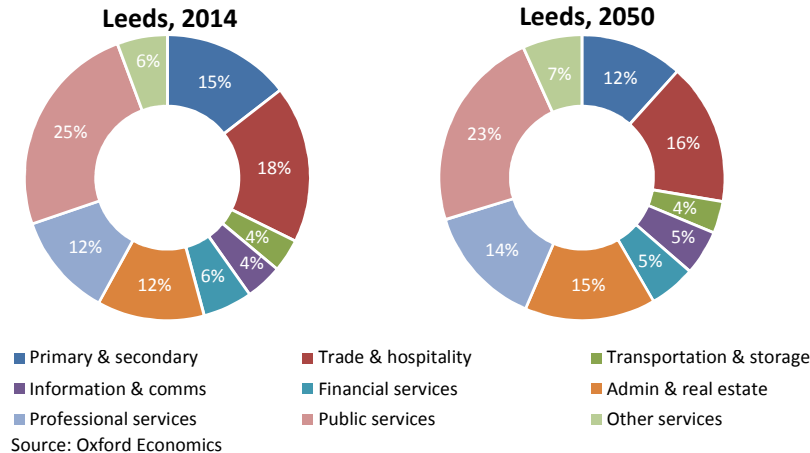
2.8 Leeds

Highlights

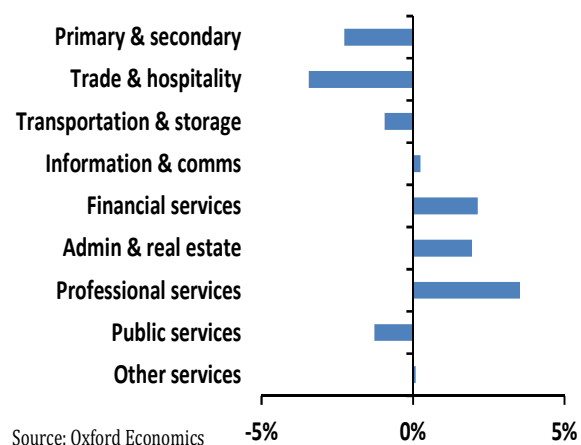
- The population of Leeds in 2014 is estimated to be 768,000, with 508,000 people of working age. The total employment level in the city is currently around 450,000.
- The largest sector in labour market terms is the public services sector which currently supports 109,000, equating to one in every four jobs in the city. The trade and hospitality sector is the next largest source of employment in Leeds, representing 18% of all jobs in the city.
- When compared with the UK, Leeds has a stronger representation of professional services employment. The sector accounts for over 12% of total employment in Leeds compared with 8% across the UK. The admin & real estate and financial services sectors are also slightly more concentrated in Leeds than the UK. Trade and hospitality, by contrast, is under-represented in Leeds, contributing just under 18% to total employment compared with over 21% across the UK.
- The population of Leeds is forecast to grow annually by 0.4% during the period from 2014 to 2050, this level of growth lags marginally behind our expectations for the UK and will bring the total population of Leeds to 897,000 in 2050.
- Around 63,000 new jobs are forecast to be created in Leeds over the forecast period, equating to an annual average growth rate of 0.4%. This level of growth is equal to expectations at a national level over the same period and will increase the total employment level in the city to 513,000.
- The job growth over the forecast period is expected to be led by the admin & real estate and professional services sectors. These sectors are predicted to create 21,000 and 18,000 jobs respectively by 2050.
- GVA in Leeds is expected to reach £47bn in 2050 as growth rates match those estimated for across the UK. As with the employment outlook the key contributors to growth are the admin & real estate and professional services sectors.

	Leeds			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	768	897	0.4	64,521	75,774	0.5
Employment (000's)	450	513	0.4	32,709	37,444	0.4
GVA (£m, 2010)	19,314	47,122	2.5	1,394,661	3,410,995	2.5

Economic structure

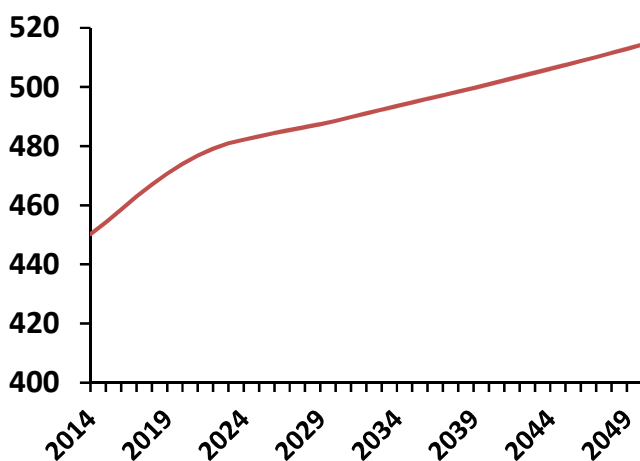


Location Quotient, Leeds v UK, 2014

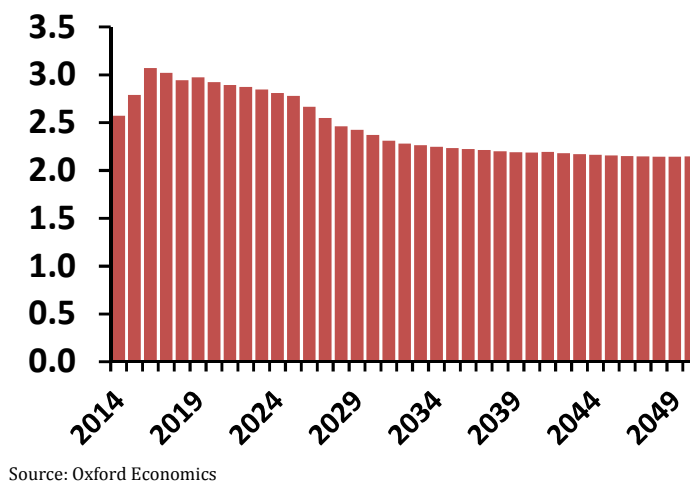


The outlook for Leeds

Employment (000s), 2014-50

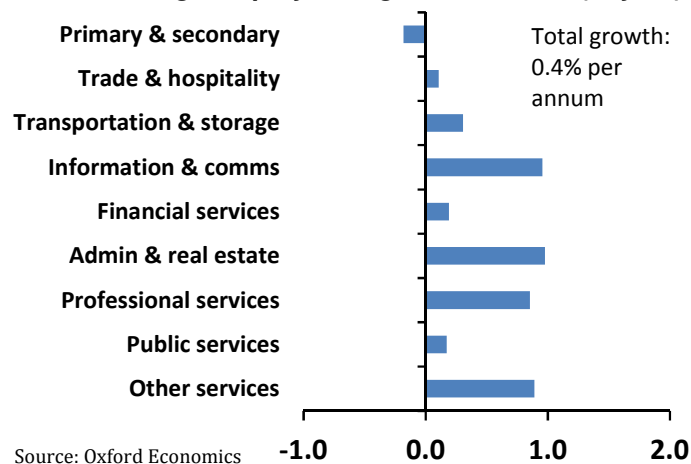


GVA growth (%), 2014-50

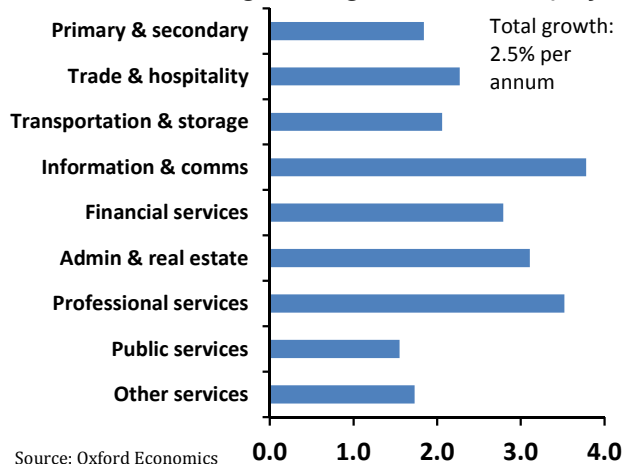


Which sectors will drive Leeds' growth?

Annual average employment growth 2014-50 (%/year)



Annual average GVA growth 2014-50 (%/year)



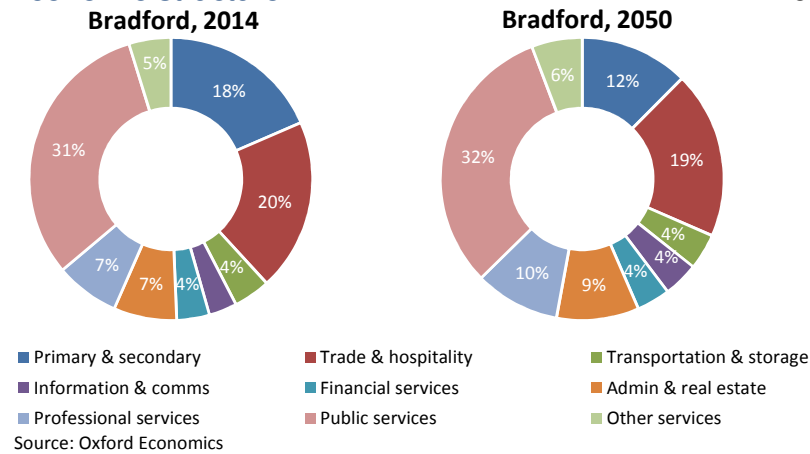
2.9 Bradford

Highlights

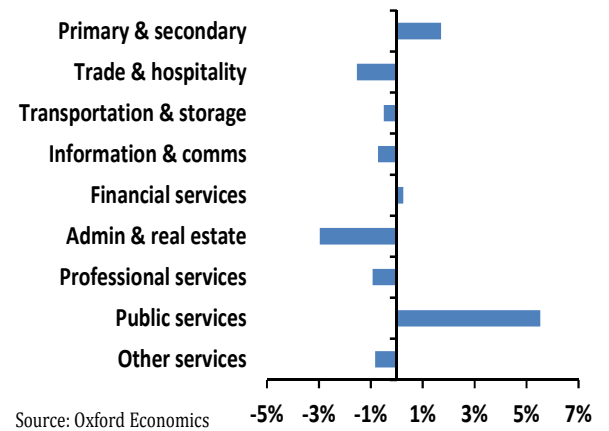
- The total population of Bradford in 2014 is estimated to be around 531,000, with 330,000 of these people of working age. The total employment level in Bradford is estimated at 211,000.
- The public services sector is currently Bradford's largest employer, accounting for over 66,000 jobs and 31% of total employment in the city. The next largest contributor to jobs is the trade and hospitality sector which represents one in every five jobs in the economy.
- Bradford's sectoral structure differs slightly from the UK, the public services sector is more prominent in Bradford, with a 6ppd to the national average. Furthermore the admin & real estate sector is under-represented in Bradford when compared with the UK. This sector contributes 7% to total employment in Bradford's economy compared with 10% across the UK.
- Bradford's population is forecast to grow broadly in line with our expectations at the national level. 0.5% annual average growth over the period from 2014-2050 will bring the total population to 628,000, an increase of 100,000 people.
- Employment growth in Bradford over the period from 2014 to 2050 is expected to lag marginally behind the growth of the UK. Annual average growth of 0.3% is expected in the city, compared with 0.4% across the UK. Total employment in Bradford in 2050 is estimated to reach 236,000.
- The biggest contributor to employment growth, in absolute terms, over the forecast period is predicted to come in the public services sector. The sector is set to enjoy growth of 8,500 jobs by 2050. Strong growth is also forecast in the admin & real estate and professional services sectors which are both expected to grow annually by 1.1% during the period from 2014-2050.
- GVA in Bradford is forecast to reach £18.7bn by 2050, representing 2.4% annual average growth over the forecast period, as with the outlook for employment GVA growth is set to lag behind the growth observed at the national level.

	Bradford			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	531	628	0.5	64,521	75,774	0.5
Employment (000's)	211	236	0.3	32,709	37,444	0.4
GVA (£m, 2010)	8,040	18,727	2.4	1,394,661	3,410,995	2.5

Economic structure

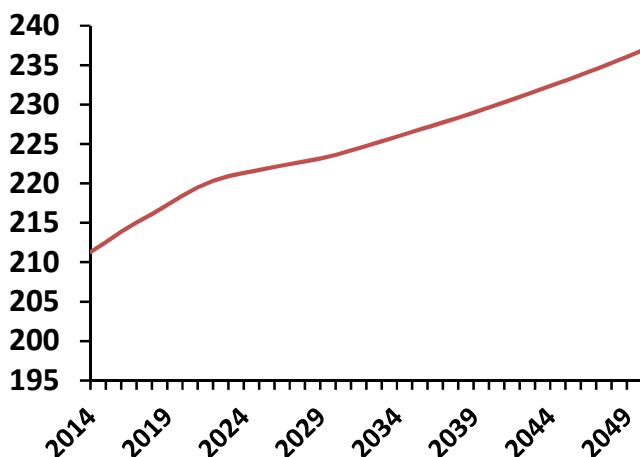


Location Quotient, Bradford v UK, 2014

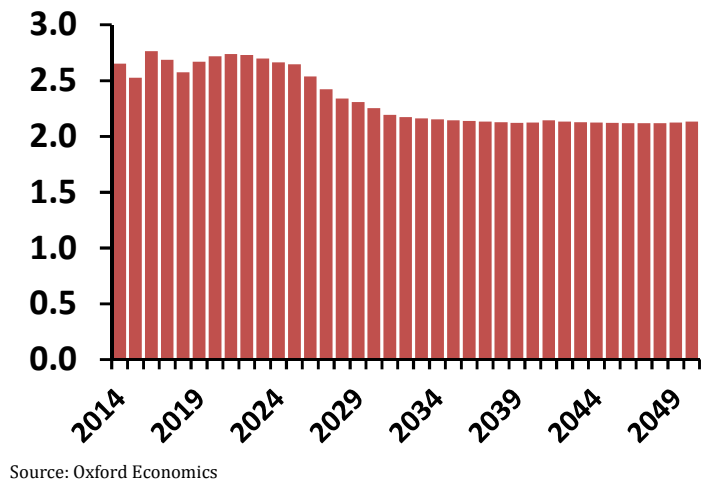


The outlook for Bradford

Employment (000s), 2014-50

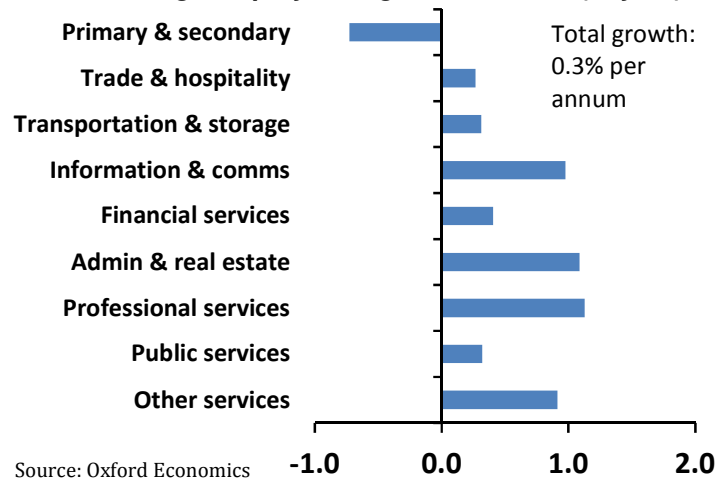


GVA growth (%), 2014-50

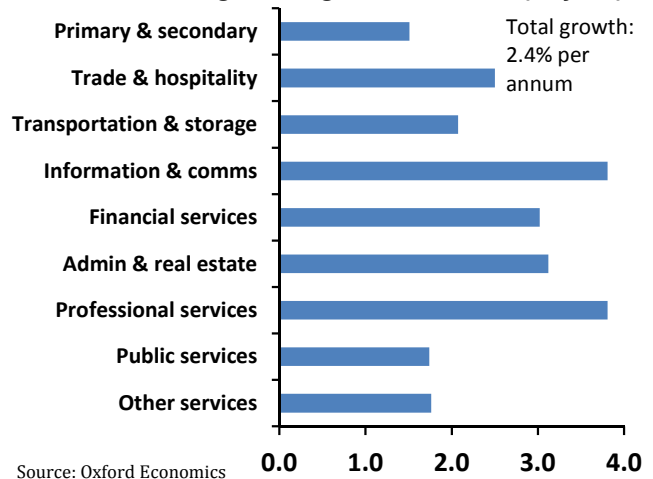


Which sectors will drive Bradford's growth?

Annual average employment growth 2014-50 (%/year)



Annual average GVA growth 2014-50 (%/year)



2.10 Highland

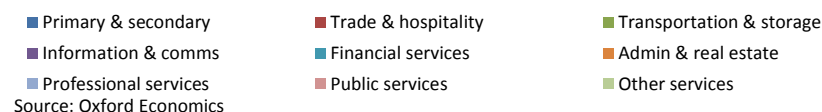
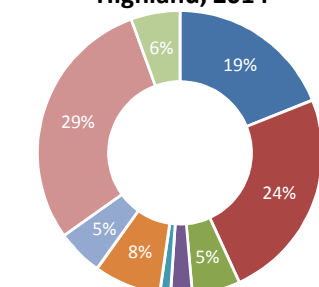
Highlights

- The current population of the Highlands is estimated to be 234,000, with the number of working age people in the area estimated to be 146,000. Total employment is estimated to be 116,000.
- The public services sector is the largest in the Highlands, accounting for 34,000 jobs and 29% of total employment. Providing 28,000 jobs and accounting for 24% of total employment, trade and hospitality is the second largest sector. Accounting for 22,000 jobs and almost a fifth of employment in the Highlands, the primary and secondary sector is also a significant sector in labour market terms.
- Trade and hospitality is 3% more highly concentrated in the Highlands than in the UK. In contrast, admin & real estate and professional services are both under-represented in the Highlands by 3% relative to the UK average.
- Population growth in the Highlands in the period 2014-2050 is expected to lag marginally behind the UK average. Annual average growth of 0.4% is forecast in the Highlands, compared with 0.5% in the UK. As such population is expected to increase in the area by 32,000 bringing the overall level to 266,000 by 2050.
- The marginally slower population growth is underpinned by a weak employment forecast. The rate of employment growth in the Highlands is expected to average 0.3% annually over the period to 2050, slower than the 0.4% growth forecast for the UK. The employment outlook is predicted to generate 14,000 new jobs by 2050
- The largest growth in jobs is expected to come from the admin & real estate sector which is forecast to generate 3,900 new jobs by 2050 growing at an annual rate of 1.0%. In contrast, the primary and secondary sector is predicted to contract marginally over the period, with 1,400 job losses forecast by 2050.
- Economic output is forecast to grow by 2.2% per annum in the Highlands over the period 2014-2050, with GVA estimated to reach £7.9bn. The growth in output is driven by gains in the admin & real estate sector which is forecast to rise by almost £1.0bn. Information and communications is expected to experience the fastest growth rate, growing by 4.0% annually followed closely by the professional services sector which is predicted to grow by 3.7% per annum.

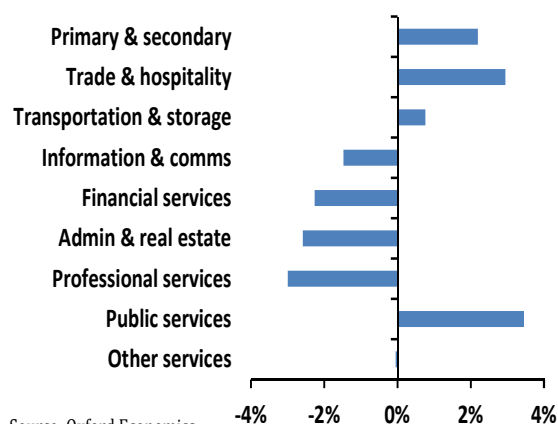
	Highland			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	234	266	0.4	64,521	75,774	0.5
Employment (000's)	116	130	0.3	32,709	37,444	0.4
GVA (£m, 2010)	3,535	7,852	2.2	1,394,661	3,410,995	2.5

Economic structure

Highland, 2014



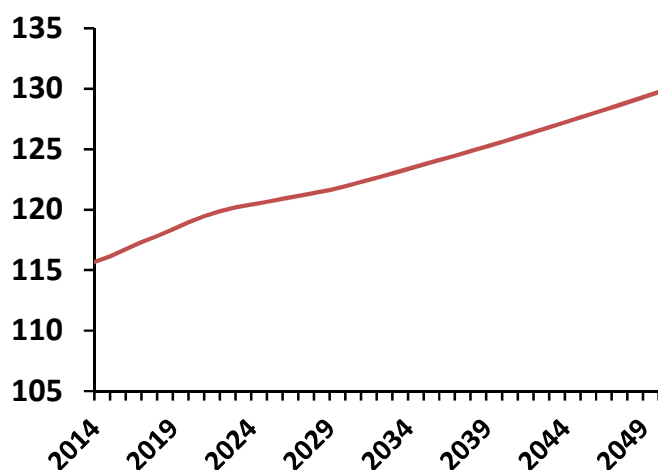
Location Quotient, Highland v UK, 2014



Source: Oxford Economics

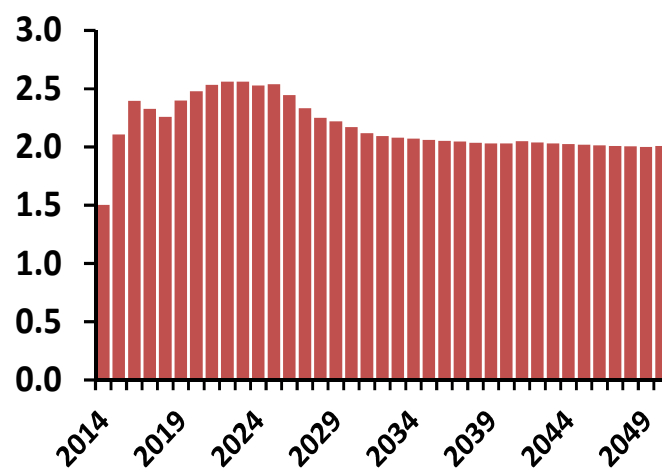
The outlook for Highland

Employment (000s), 2014-50



Source: Oxford Economics

GVA growth (%), 2014-50

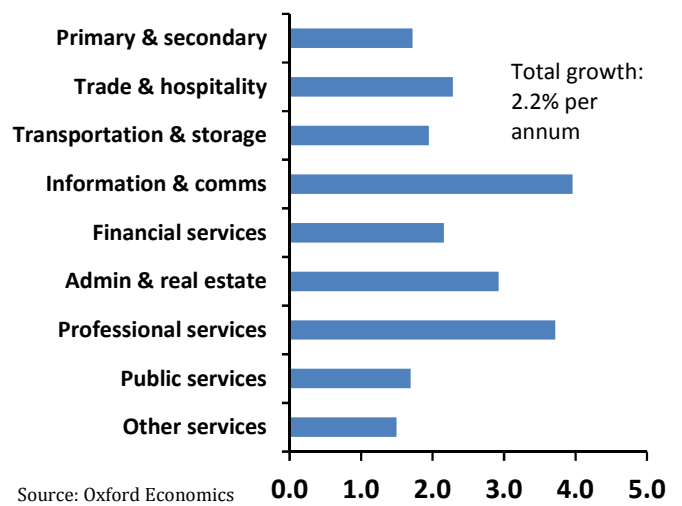
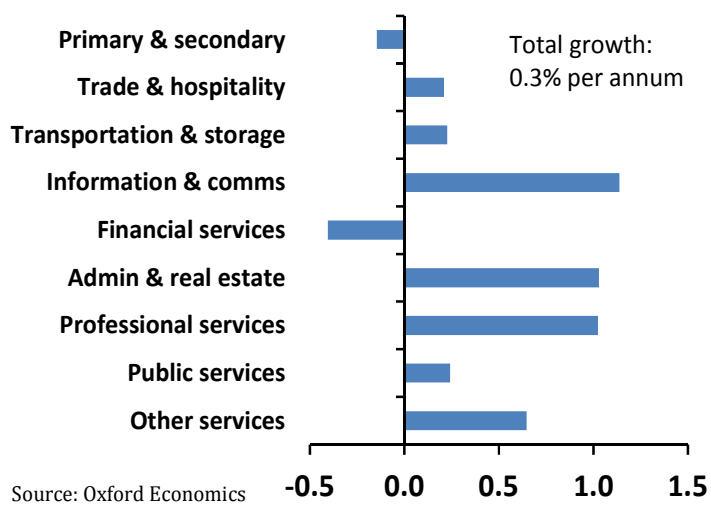


Source: Oxford Economics

Which sectors will drive Highland's growth?

Annual average employment growth 2014-50 (%/year)

Annual average GVA growth 2014-50 (%/year)



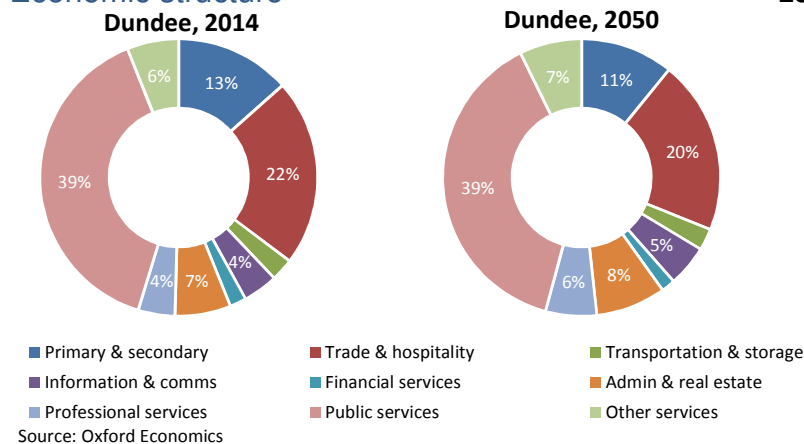
2.11 Dundee

Highlights

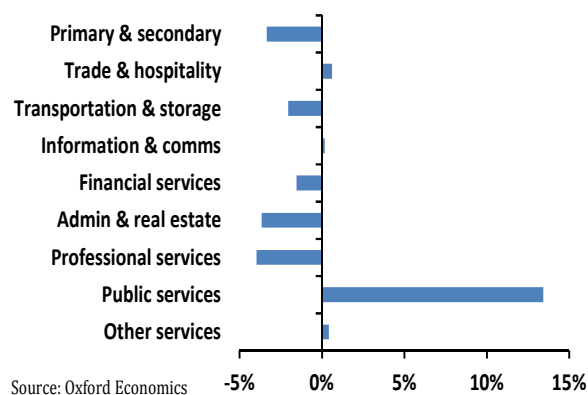
- The population of Dundee in 2014 is estimated to be 148,000 with 98,000 people of working age. Total employment in Dundee is estimated to be 78,000.
- Employment in Dundee is dominated by the public services sector which provides 31,000 jobs with health care providing 17,000 alone. Trade and hospitality also accounts for 17,000 jobs, representing 22% of employment in Dundee.
- With a 39% share of employment, public services are highly concentrated in Dundee relative to the UK average of 26%. Professional services (4%) and admin & real estate (7%) are underrepresented in Dundee with 4% lower concentrations than at the UK level.
- Forecasts suggest that Dundee's population will increase by 10,000 between 2014 and 2050, though working age population is expected to remain flat over the period.
- In the period 2014 to 2050, forecasts suggest that 5,000 additional jobs will be created in Dundee, with average growth of 0.2% per annum. Dundee's growth is half the 0.4% annual growth rate experienced across the UK over the same period.
- Admin & real estate is estimated to undergo the greatest expansion in absolute terms, creating 1,700 additional jobs between 2014 and 2050. The professional services sector is forecast to experience the fastest rate of growth, rising at 1.1% per annum with the creation of 1,600 additional jobs. Public services are forecast to create 1,400 jobs to remain the largest sector, retaining 39% share of total employment.
- GVA in Dundee is forecast to increase by £3.3bn from 2014 to 2050. Rising at an average rate of 2.0% each year, Dundee's growth in the period is slower than the UK average of 2.5%. Public services and admin & real estate each add £0.7bn to output over the period, growing at 1.5% and 2.5% per annum respectively. Professional services (3.8%) and information & communications (3.5%) are the highest growth sectors in the period.

	Dundee			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	148	158	0.2	64,521	75,774	0.5
Employment (000's)	78	83	0.2	32,709	37,444	0.4
GVA (£m, 2010)	3,068	6,349	2.0	1,394,661	3,410,995	2.5

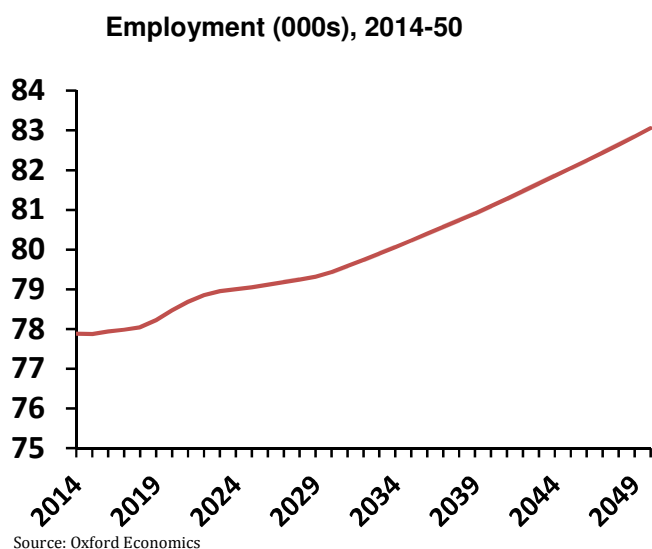
Economic structure



Location Quotient, Dundee v UK, 2014



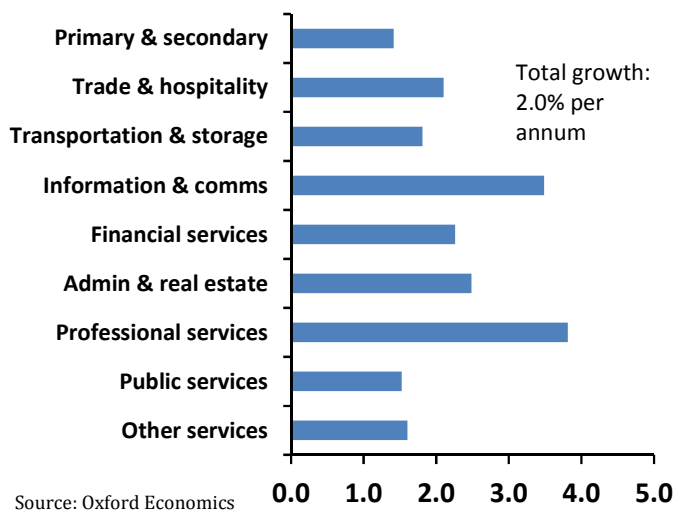
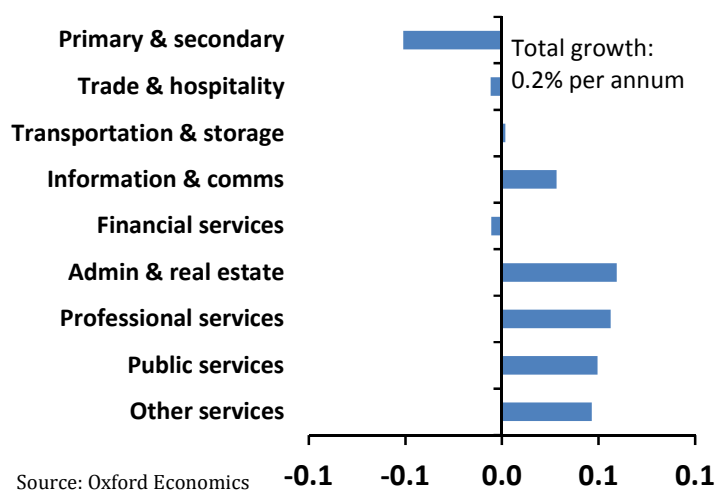
The outlook for Dundee



Which sectors will drive Dundee's growth?

Annual average employment growth 2014-50 (%/year)

Annual average GVA growth 2014-50 (%/year)



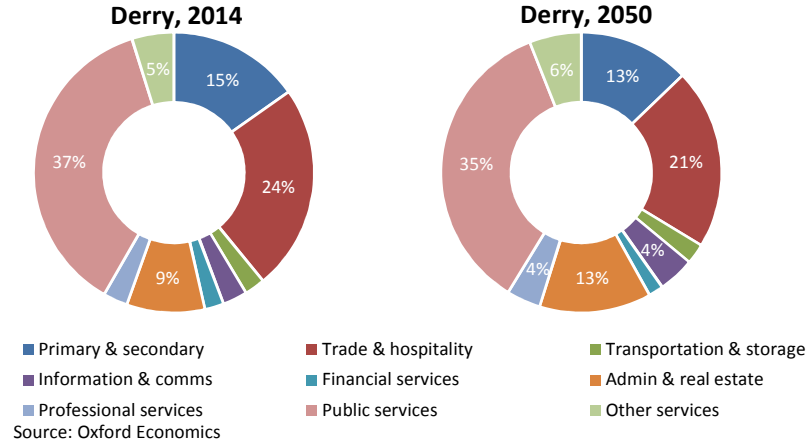
2.12 Derry

Highlights

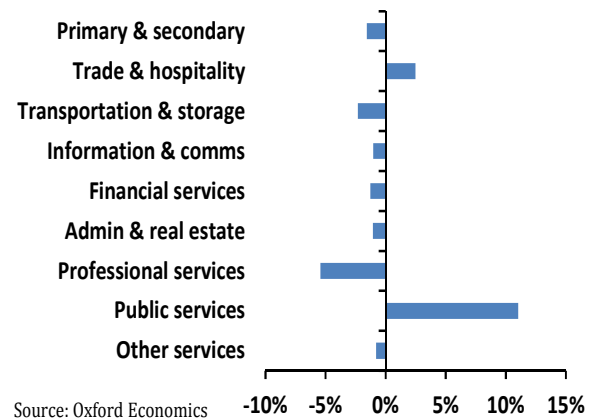
- The total population of Derry in 2014 is estimated to be around 109,000, with 71,000 of these people of working age. The total employment level in Derry is around 48,000.
- The public services sector is currently Derry's largest employer, with a workforce of 17,700 accounting for 37% of total employment. The second largest industry is the trade & hospitality sector which supports 11,400 jobs in the city.
- The public services sector is heavily concentrated in Derry, with an 11ppd between the city and the UK average (26%). Professional services have a low representation, accounting for only 3% of total employment.
- Derry's population is forecast to rise by 10,000 in the period, reaching an expected total of 119,000 by 2050. Population growth is predicted to average 0.2% annually in Derry, falling well short of the UK average (0.5%).
- Employment is forecast to grow by 0.4% per annum over the period 2014 to 2050, matching national growth. Employment growth in the period is predicted to generate 7,000 new jobs with employment reaching 55,000 by 2050.
- Growth in Derry will be driven by admin & real estate which is expected to create 2,700 additional jobs, growing at an annual average rate of 1.4%. The public services sector will experience weak growth and account for 4% less of total employment by 2050. However, over the long term it is expected to create 1,600 jobs.
- Output in Derry is forecast to grow by 2.3% per annum in the period to 2050 with the addition of £2.4bn to GVA, marginally lagging the national average growth rate of 2.5%. Admin & real estate is predicted to increase by £0.7bn by 2050, growing at an average rate of 3.2% annually. Information & communications and professional services are expected to expand the fastest, growing annually by 4.3% and 4.0% respectively.

	Derry			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	109	119	0.2	64,521	75,774	0.5
Employment (000's)	48	55	0.4	32,709	37,444	0.4
GVA (£m, 2010)	1,837	4,246	2.3	1,394,661	3,410,995	2.5

Economic structure

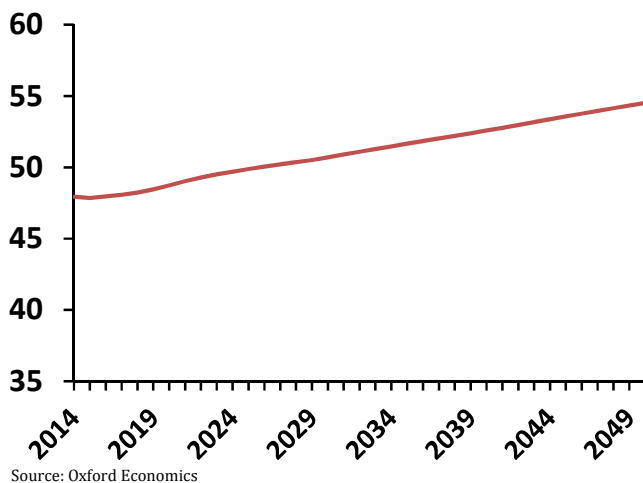


Location Quotient, Derry v UK, 2014

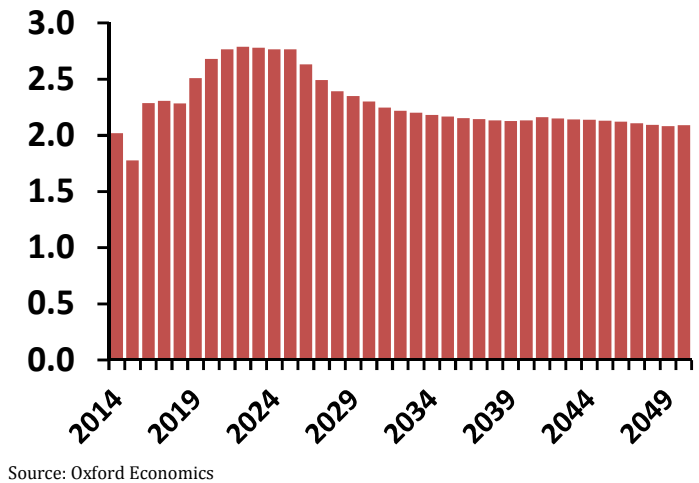


The outlook for Derry

Employment (000s), 2014-50

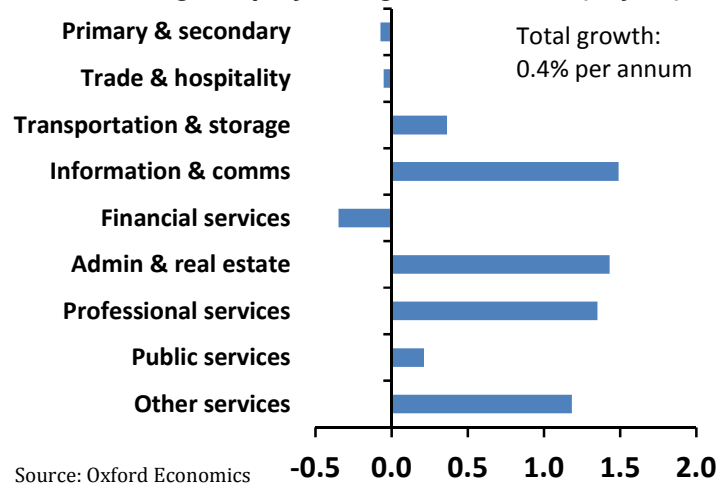


GVA growth (%), 2014-50

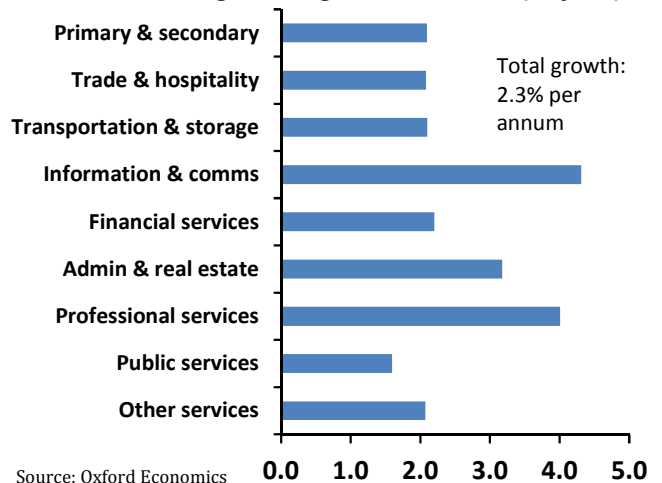


Which sectors will drive Derry's growth?

Annual average employment growth 2014-50 (%/year)



Annual average GVA growth 2014-50 (%/year)



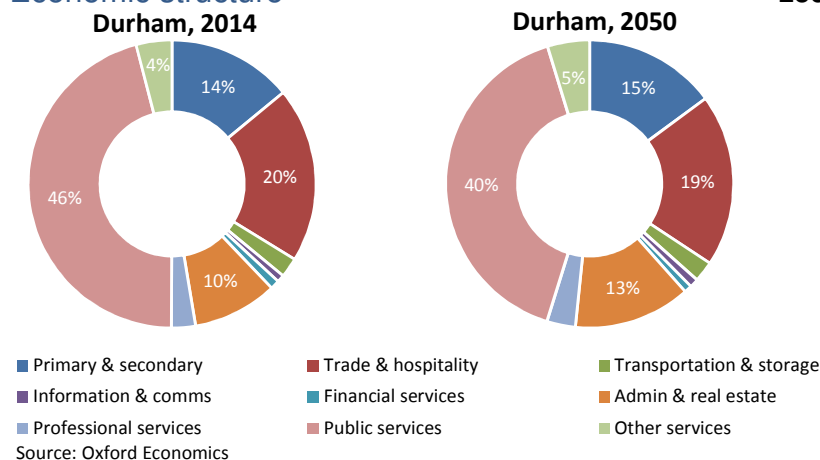
2.13 Durham

Highlights

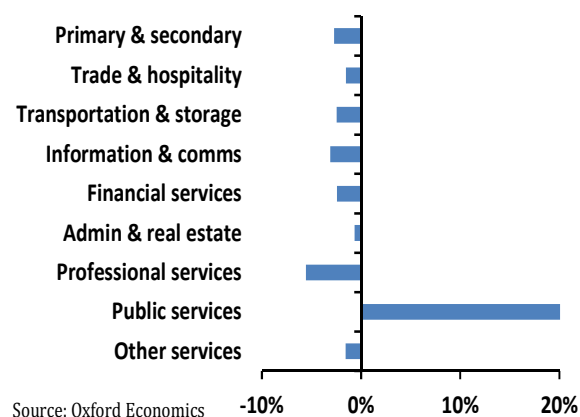
- The population of Durham in 2014 is estimated to be 92,000 with 64,000 people of working age. Total employment in Durham is currently estimated to be 49,200.
- Employment in Durham is heavily dominated by the public services sector. The sector contributes around 22,000 jobs to the city which equates to a 46% share of the total employment level. The second largest sector is trade and hospitality which accounts for around one in every five jobs in the economy.
- Durham's sectoral structure is heavily skewed towards the public services sector. The sector is close to capturing 50% of all jobs in the city, compared with around 26% across the UK as a whole. As a result of the public services dominance all other sectors are under-represented in Durham, most notably the professional services sector which captures just 3% of total employment in 2014.
- Our forecasts suggest that Durham's population will grow to 100,000 by 2050, representing a relatively slow annual average growth rate of 0.2%.
- The total employment level of Durham is forecast to reach 54,000 by 2050, equivalent to an annual average growth rate of 0.3% across the forecast period. This rate of growth places Durham marginally behind our growth expectations at the national level (0.4%).
- Our relatively weak employment outlook for Durham is heavily underpinned by contractions which are expected within the public services sector. Probably over the short run as austerity measures are implemented. The admin & real estate sector, by contrast is expected to enjoy positive growth, with around 2,500 new jobs forecast across the period from 2014-2050.
- GVA in Durham is expected to rise by around £2.1bn to £4.0bn by 2050, corresponding to an annual average growth rate of 2.1%. This rate of growth lags behind the 2.5% rate expected at the national level across the same period.

	Durham			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	92	100	0.2	64,521	75,774	0.5
Employment (000's)	49	54	0.3	32,709	37,444	0.4
GVA (£m, 2010)	1,888	3,975	2.1	1,394,661	3,410,995	2.5

Economic structure

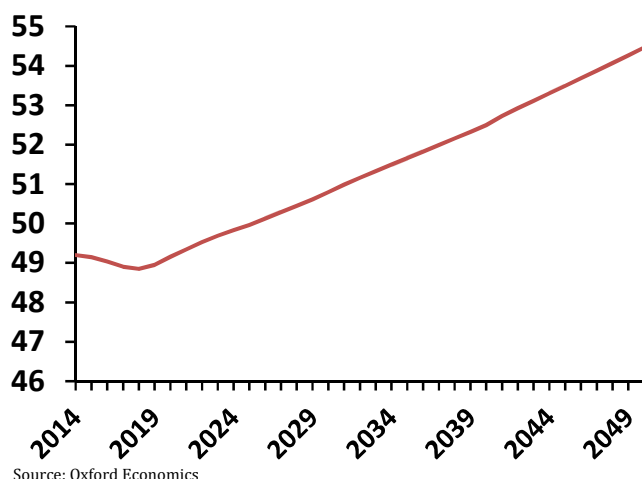


Location Quotient, Durham v UK, 2014

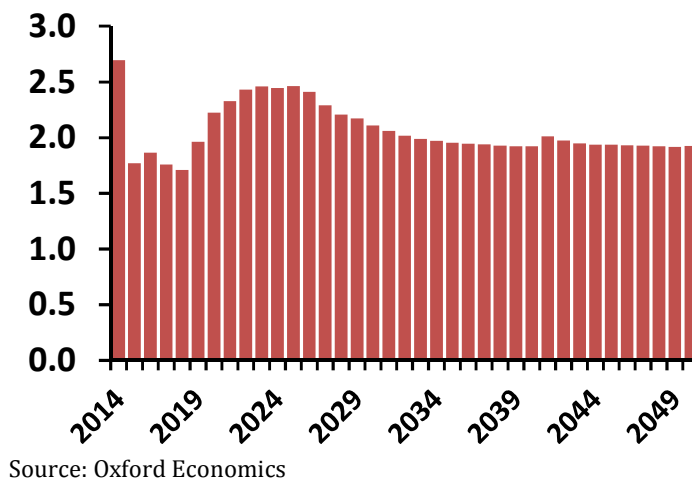


The outlook for Durham

Employment (000s), 2014-50

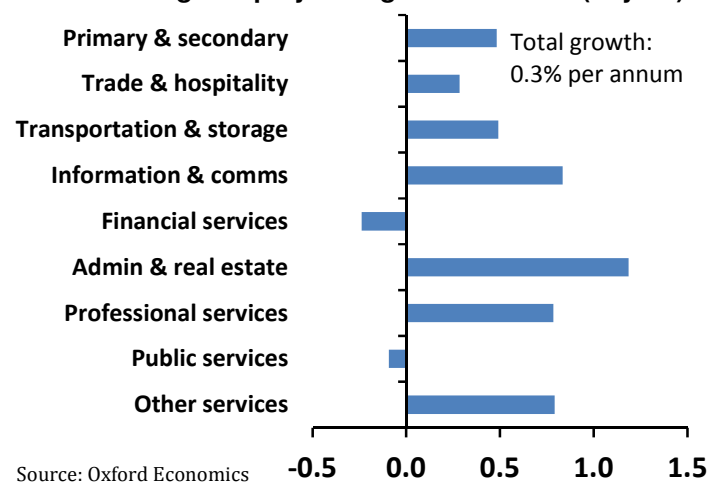


GVA growth (%), 2014-50

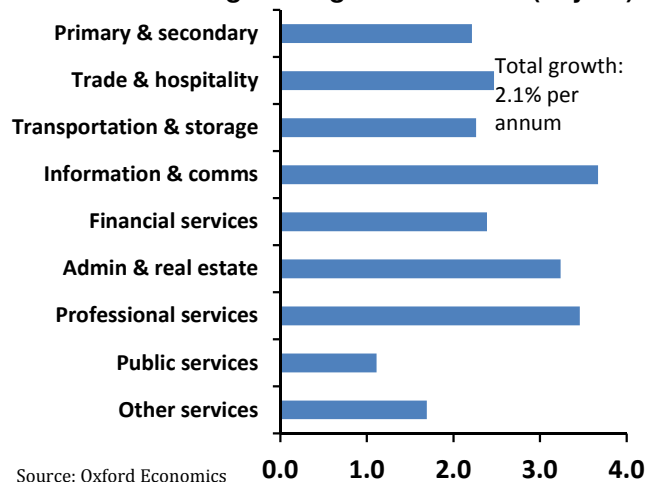


Which sectors will drive Durham's growth?

Annual average employment growth 2014-50 (%/year)



Annual average GVA growth 2014-50 (%/year)



2.14 Middlesbrough

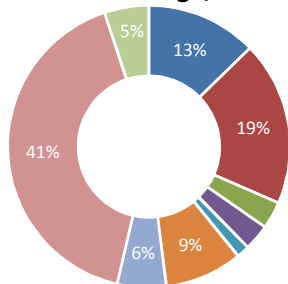
Highlights

- The total population of Middlesbrough in 2014 is estimated to be 139,000, of which 87,000 people are of working age. Total employment is estimated to be 63,000.
- The public services sector is the largest sector in Middlesbrough, accounting for over 26,000 jobs and representing 41% of total employment in the city. The next largest sector is the trade and hospitality sector which contributes around 19% to total employment.
- The sectoral employment structure of Middlesbrough is heavily skewed towards the public services sector, capturing 12% more of total employment than in the UK. Public services dominance in the city leaves all other sectors under-represented when compared against the UK.
- The population of Middlesbrough is forecast to grow to 148,000 by 2050, corresponding to an annual average growth rate of 0.2%, significantly slower than the 0.5% annual growth expected across the UK over the same period.
- The outlook for employment in Middlesbrough is relatively weak. An annual average growth rate of 0.2% is forecast for the city, generating just 6,000 additional jobs by 2050.
- Employment growth in Middlesbrough over the forecast period is set to be underpinned by expansions in the primary & secondary, admin & real estate and professional services sectors. These sectors are forecast to generate 4,000 new jobs between them by 2050. Growth in public services is expected to be mute with employment in the sector remaining flat in the long run.
- GVA growth in Middlesbrough is forecast to average 2.2% annually during the period from 2014 to 2050, placing the city marginally behind our national growth expectations (2.5%). GVA growth at this rate will bring Middlesbrough's total GVA to £5.2bn in 2050, representing absolute growth of £2.8bn. Sectorally the information & communications sector is expected to grow the fastest in Middlesbrough, with 3.7% annual average growth forecast in this sector over the forecast period.

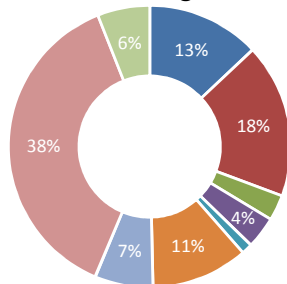
	Middlesbrough			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	139	148	0.2	64,521	75,774	0.5
Employment (000's)	63	69	0.2	32,709	37,444	0.4
GVA (£m, 2010)	2,361	5,159	2.2	1,394,661	3,410,995	2.5

Economic structure

Middlesbrough, 2014

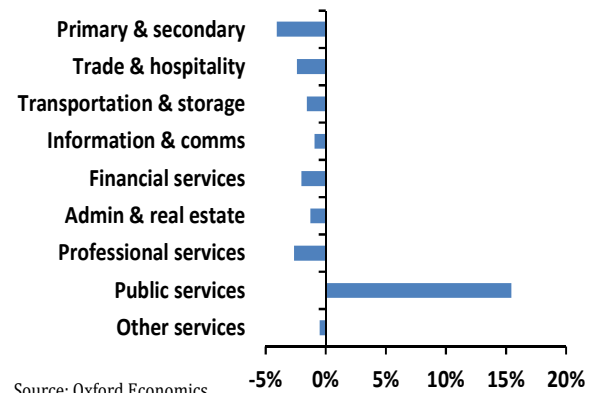


Middlesbrough, 2050



Source: Oxford Economics

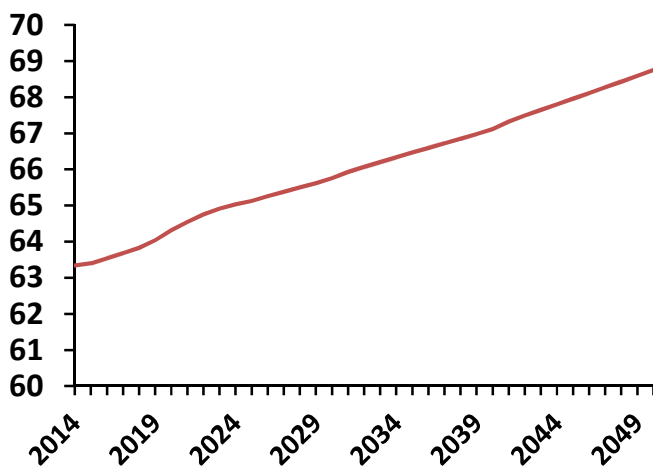
Location Quotient, Middlesbrough v UK, 2014



Source: Oxford Economics

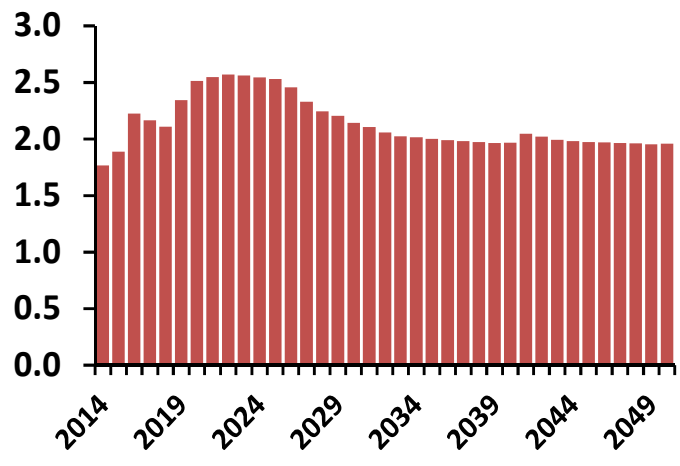
The outlook for Middlesbrough

Employment (000s), 2014-50



Source: Oxford Economics

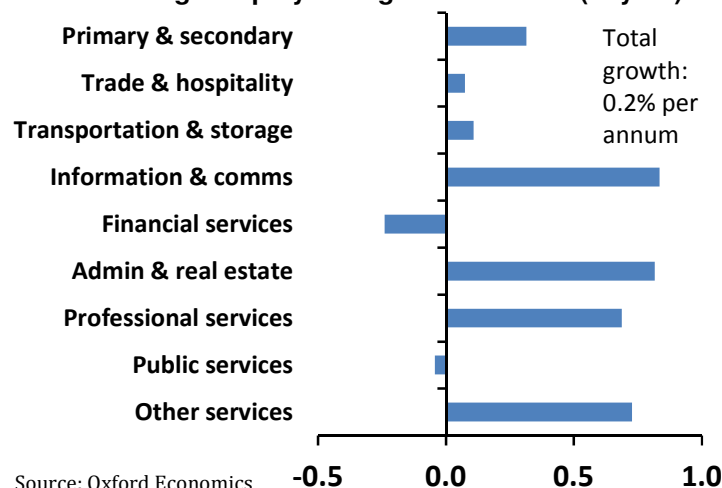
GVA growth (%), 2014-50



Source: Oxford Economics

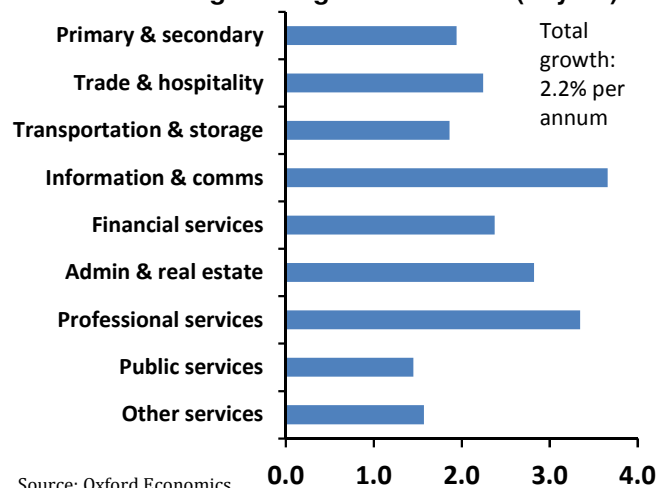
Which sectors will drive Middlesbrough's growth?

Annual average employment growth 2014-50 (%/year)



Source: Oxford Economics

Annual average GVA growth 2014-50 (%/year)



Source: Oxford Economics

2.15 Liverpool

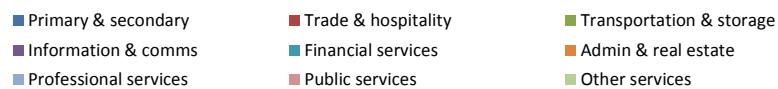
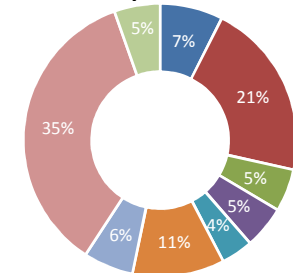
Highlights

- The total population of Liverpool in 2014 is estimated to be 473,000, with 323,000 people of working age. The total employment level in 2014 is around 251,000.
- The public services sector is the largest sector in Liverpool, with 89,000 jobs equating to 35% of the total employment level. The next largest sector is the trade and hospitality sector which represents 21% of total employment in the city.
- When compared with the UK it is evident that Liverpool is much more heavily concentrated in the public services sector, with the sector accounting for 35% of total employment in the city compared with just 26% in the UK. Contrastingly Liverpool is significantly less concentrated in the primary and secondary sector with this sector contributing just 7% of total employment in Liverpool compared with 17% across the UK as a whole.
- The population of Liverpool is expected to rise to by 20,000 to 493,000 by 2050; this corresponds to an annual average growth rate of 0.1% and places the city significantly behind our growth expectations for the UK as a whole.
- Despite our weak population outlook the total employment level in Liverpool is forecast to rise to 286,000 by 2050, representing an annual average growth rate of 0.4% which is in line with our expectation at the national level. Our strong employment outlook is heavily underpinned by gains in the admin & real estate and professional services sectors which are estimated to create 18,000 and 6,000 jobs respectively by 2050. By contrast the primary and secondary sector is expected to experience minor job losses over the forecast period.
- Total GVA in Liverpool is forecast to reach £23.8bn by 2050 representing an annual average growth rate of 2.4% which falls marginally behind the expectations at the national level (2.5%). As with employment, GVA growth is set to be led by the admin & real estate and professional services sectors.

	Liverpool			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	473	493	0.1	64,521	75,774	0.5
Employment (000's)	251	286	0.4	32,709	37,444	0.4
GVA (£m, 2010)	10,058	23,802	2.4	1,394,661	3,410,995	2.5

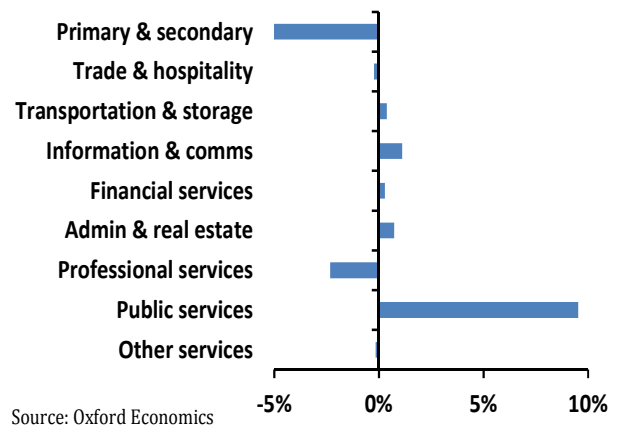
Economic structure

Liverpool, 2014



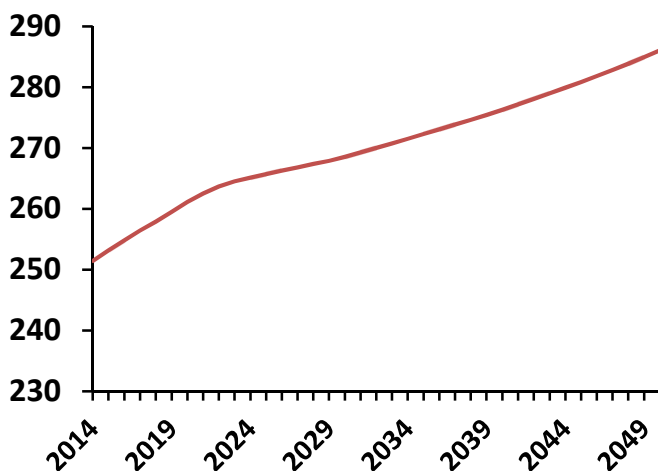
Source: Oxford Economics

Location Quotient, Liverpool v UK, 2014

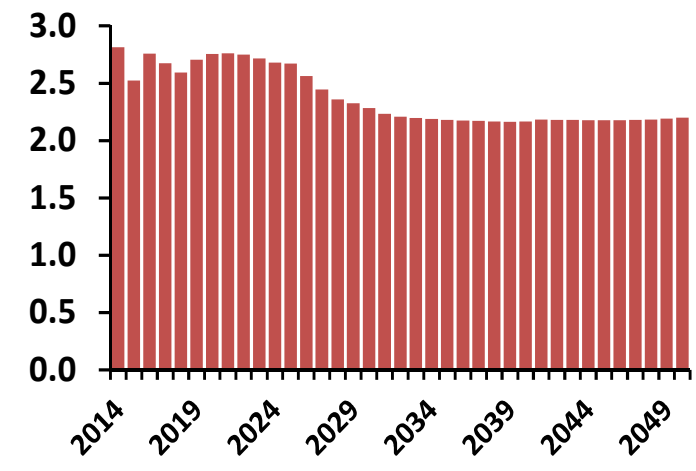


The outlook for Liverpool

Employment (000s), 2014-50

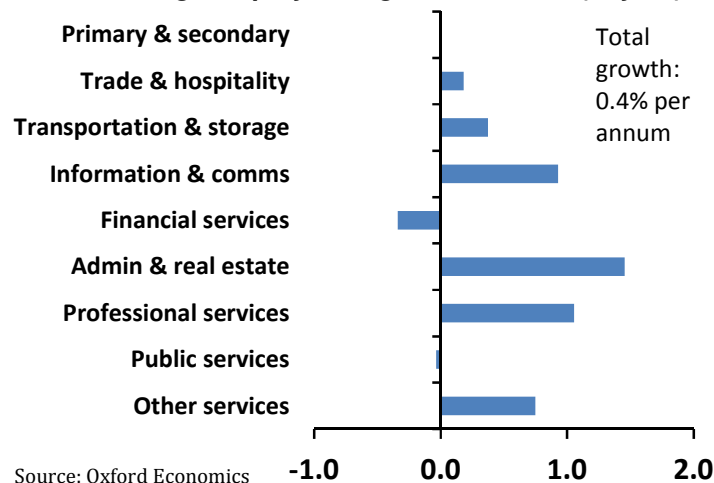


GVA growth (%), 2014-50

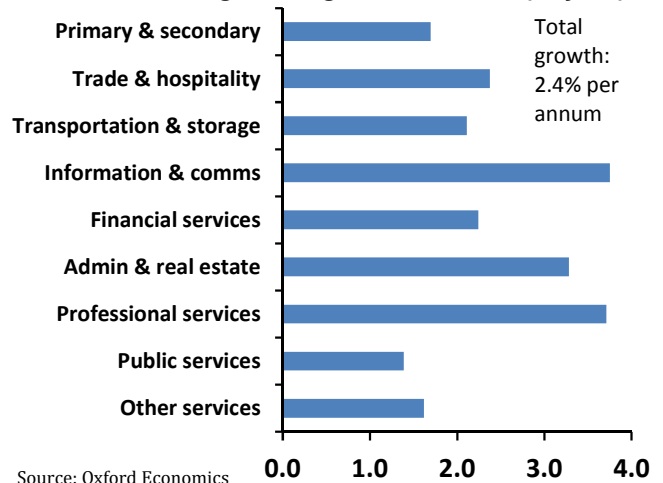


Which sectors will drive Liverpool's growth?

Annual average employment growth 2014-50 (%/year)



Annual average GVA growth 2014-50 (%/year)



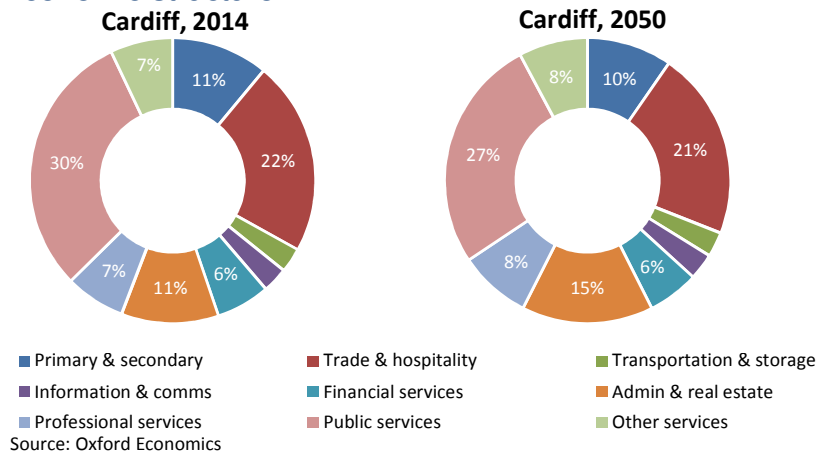
2.16 Cardiff

Highlights

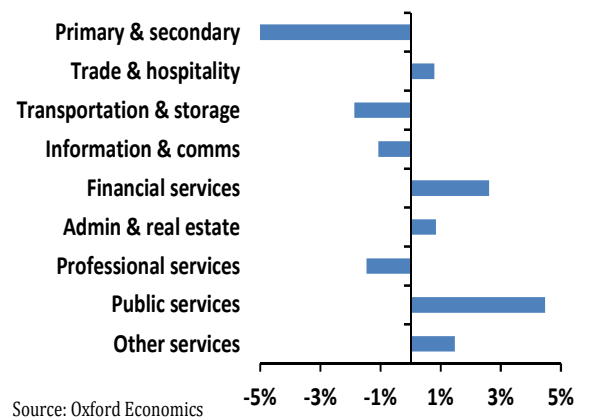
- The population of Cardiff in 2014 is estimated to be 351,000, with 238,000 people in the city of working age. The total employment level in 2014 is estimated to be at 211,000.
- The public services sector is the largest employer in Cardiff in 2014, with 64,000 jobs representing 30% of total employment. The trade and hospitality sector is the next largest contributor of jobs, accounting for 22% of total employment.
- With just an 11% share of total employment, the primary and secondary sector is less concentrated in Cardiff than in the UK (17%). Although somewhat more surprisingly perhaps, Cardiff is marginally less concentrated in the professional services sector than the UK. The sector represents just 7% of total employment in the city.
- Population growth in Cardiff over the period from 2014 to 2050 is expected to be weak with just 0.1% annual average growth forecast for the city compared with 0.5% across the UK. The weak population outlook for Cardiff is underpinned by the weak employment outlook for the city. Just 15,000 new jobs are forecast to be generated by 2050, representing an annual growth rate of 0.2% across the forecast period.
- Harsh public service sector job losses are at the heart of Cardiff's weak employment outlook, with 4,000 job losses expected in the Welsh capital by 2050. Strong growth is forecast in the admin & real estate sector, with over 10,000 new jobs estimated to be generated by 2050, representing an annual growth rate of 1.0%.
- The outlook for GVA in Cardiff is somewhat more positive than employment, although the city is still forecast to lag behind the national average. GVA is forecast to reach £18.9bn by 2050, corresponding to a per annum growth rate of 2.3% over the period.
- As with the employment outlook the growth in GVA will be largely dependent upon an expanding admin & real estate sector. Growth in the information & communications and professional services sectors will also contribute significantly.

	Cardiff			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	351	359	0.1	64,521	75,774	0.5
Employment (000's)	212	227	0.2	32,709	37,444	0.4
GVA (£m, 2010)	8,243	18,854	2.3	1,394,661	3,410,995	2.5

Economic structure

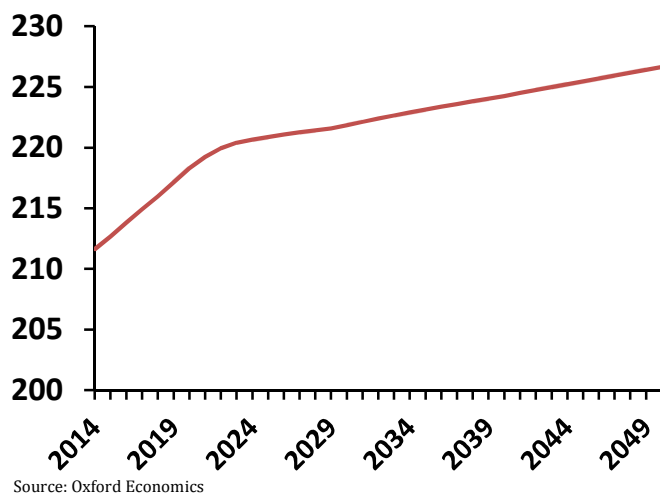


Location Quotient, Cardiff v UK, 2014

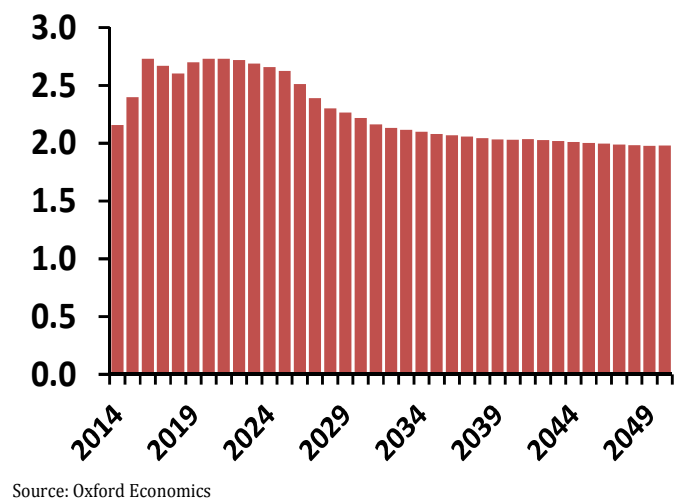


The outlook for Cardiff

Employment (000s), 2014-50



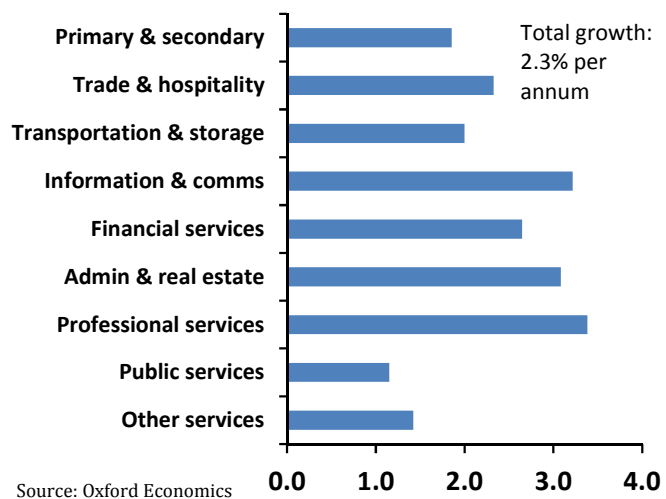
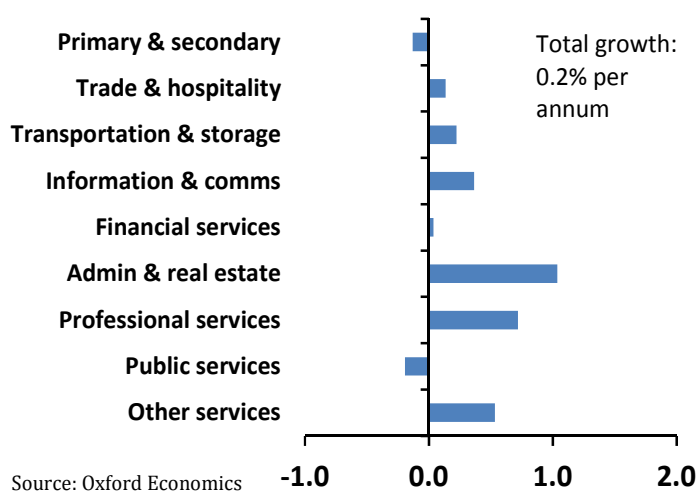
GVA growth (%), 2014-50



Which sectors will drive Cardiff's growth?

Annual average employment growth 2014-50 (%/year)

Annual average GVA growth 2014-50 (%/year)



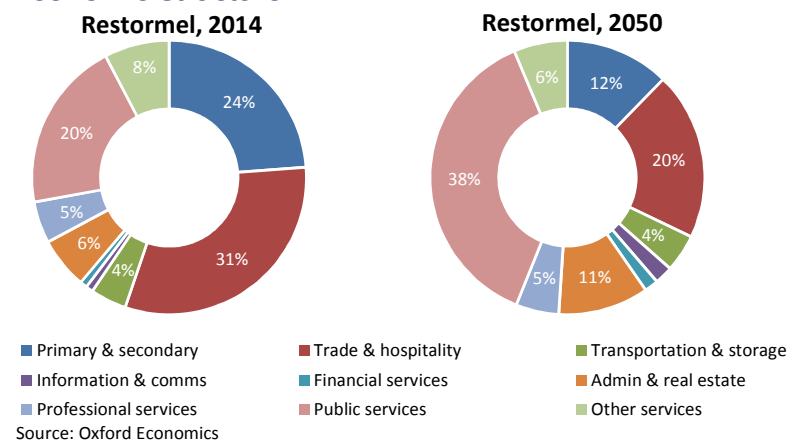
2.17 Restormel

Highlights

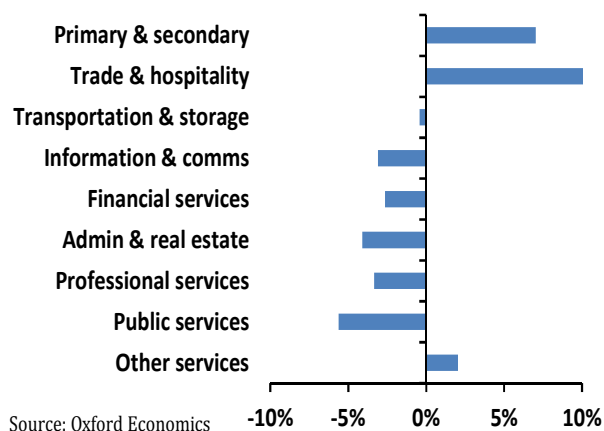
- The population of Restormel in 2014 is estimated to be 104,000 with 63,000 people of working age. Total employment in Restormel is currently estimated to be 52,000.
- Employment in Restormel is heavily dominated by the trade and hospitality sector, with over 16,000 employees accounting for around 31% of total employment in the city. The second largest sector, in labour market terms, is the primary and secondary sector which supports over 12,000 jobs in the economy.
- With a 24% share of employment, the primary and secondary sector is heavily concentrated in Restormel, with a 7ppd to the UK average of 17%. Public services, by contrast, are under-represented in the city, accounting for just 20% of total employment compared with 26% in the UK.
- Our forecasts suggest that the population of Restormel in 2050 will be around 122,000, representing growth of 18,000 people. This level of growth equates to an annual average growth rate of 0.4%, lagging marginally behind the 0.5% average growth expected across the UK over the same period.
- During the period from 2014 to 2050 it is estimated that 6,000 new jobs will be created in Restormel bringing the total employment level to 58,000. This level of growth is in line with our expectations for the UK, at 0.4% annual average growth.
- Sectorally the greatest jobs growth is expected to come from the trade and hospitality sector which is forecast to generate 1,800 new jobs by 2050. The professional services sector is also forecast to enjoy strong growth, with 1,100 new jobs expected to be generated by 2050, corresponding to a per annum growth rate of 1.1%.
- GVA in Restormel is forecast to rise to £3.2bn by 2050, representing an annual average growth rate of 2.3%. Sectorally the greatest growth in GVA is expected to come from within the admin & real estate sector which is forecast to rise from £270m (2014) to £780m (2050); a per annum growth rate of 3.8%.

	Restormel			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	104	122	0.5	64,521	75,774	0.5
Employment (000's)	52	59	0.4	32,709	37,444	0.4
GVA (£m, 2010)	1,449	3,295	2.4	1,394,661	3,410,995	2.5

Economic structure

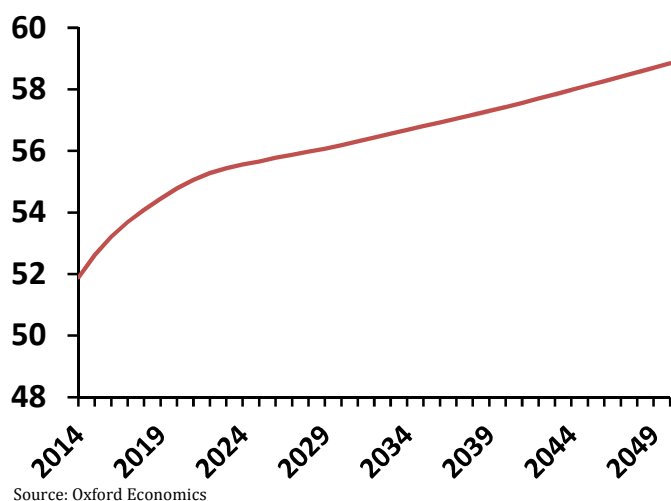


Location Quotient, Restormel v UK, 2014

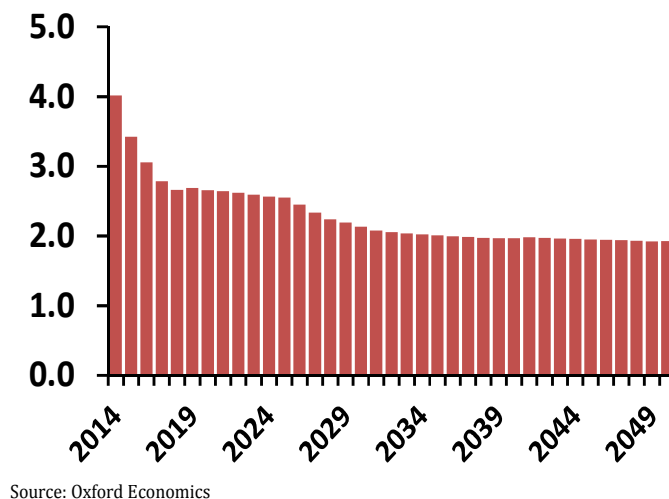


The outlook for Restormel

Employment (000s), 2014-50

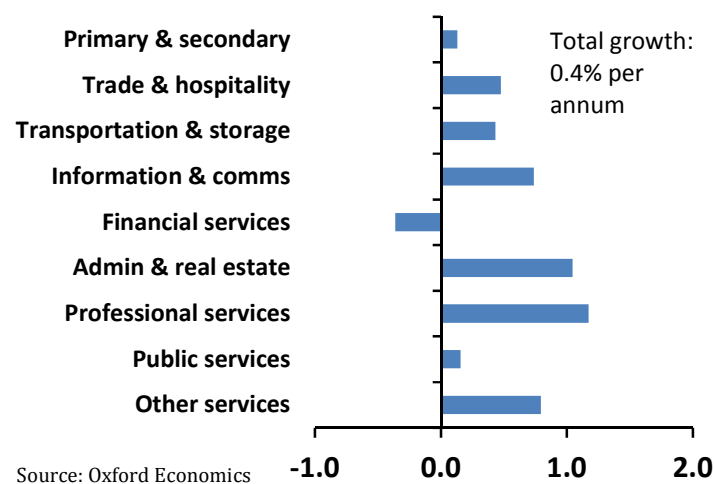


GVA growth (%), 2014-50

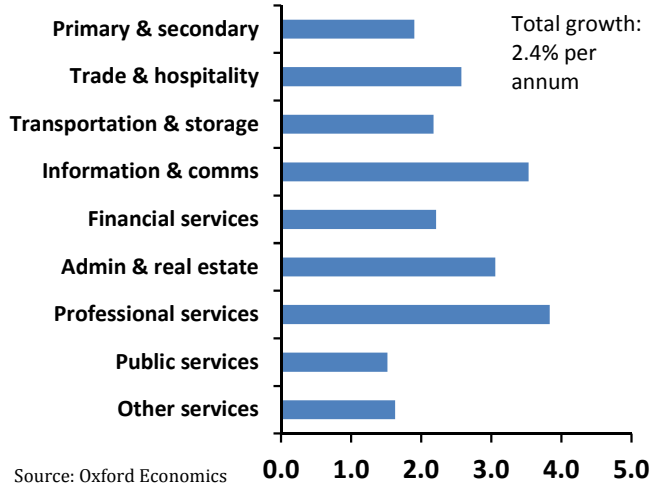


Which sectors will drive Restormel's growth?

Annual average employment growth 2014-50 (%/year)



Annual average GVA growth 2014-50 (%/year)



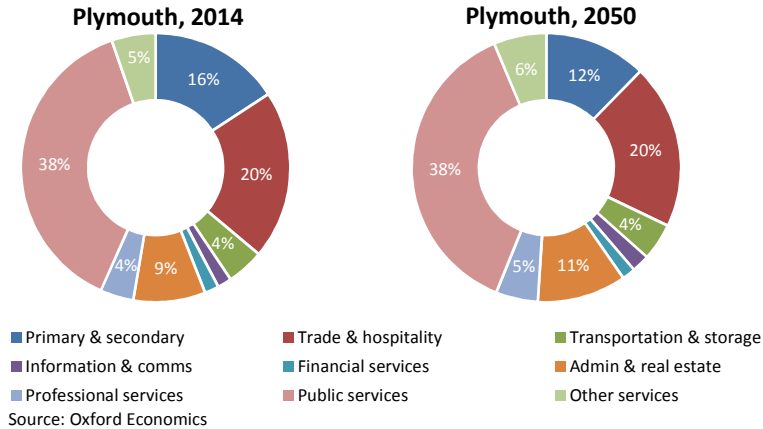
2.18 Plymouth

Highlights

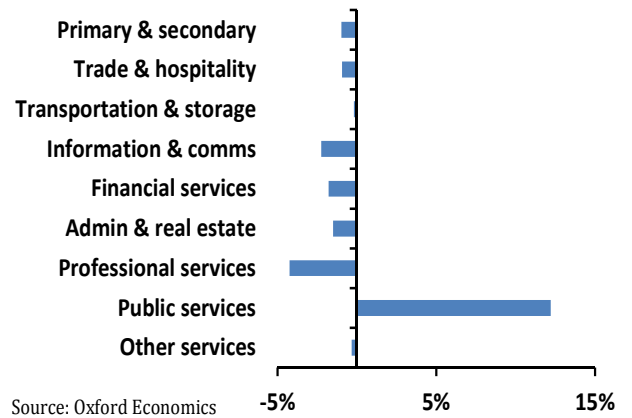
- Plymouth's population in 2014 is estimated to be around 260,000, with the working age population representing 170,000 of this total. The total employment level of Plymouth is 126,000.
 - The public services sector is currently Plymouth's largest employer, accounting for 48,000 jobs in the city. The second largest sector is the trade and hospitality sector which currently represents one in every five jobs in the economy.
 - Accounting for some 38% of all jobs in Plymouth, the public services sector is significantly more concentrated in Plymouth than in the UK (26%). The professional services sector, however, is under-represented in the economy at just 8% of the total employment level.
 - Plymouth's population is forecast to rise by 0.2% annually during the period from 2014-2050, equating to a 16,000 rise by 2050. This level of growth is significantly weaker than our expectations for the UK which is estimated to rise by 0.5% annually over the same period. Our weak population outlook is underpinned by our similarly weak employment outlook which forecasts just 0.1% growth annually to 2050,
- again lagging significantly behind the rate of growth expected nationally (0.4%).
- Sectorally the fastest growth in employment is expected to come from within the admin & real estate sector. This sector is expected to generate 2,700 new jobs by 2050, an annual average growth rate of 0.7%. The primary and secondary sector, by contrast, is expected to contract by 0.6% annually over the same period, equating to a total of 4,200 job losses by 2050.
 - Plymouth's total GVA is expected to more than double by 2050, rising to £9.4bn. The per annum growth rate of GVA, however, is expected to lag behind the national average at just 2.0%. The fastest rate of growth is forecast to come from the information & communications sector which is expected to enjoy 3.6% annual average growth during the period from 2014-2050. Despite the contractions in employment expected in the primary and secondary sector we forecast positive GVA growth of 1.0% over the same period.

	Plymouth			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	261	278	0.2	64,521	75,774	0.5
Employment (000's)	126	126	0.0	32,709	37,444	0.4
GVA (£m, 2010)	4,578	9,319	2.0	1,394,661	3,410,995	2.5

Economic structure

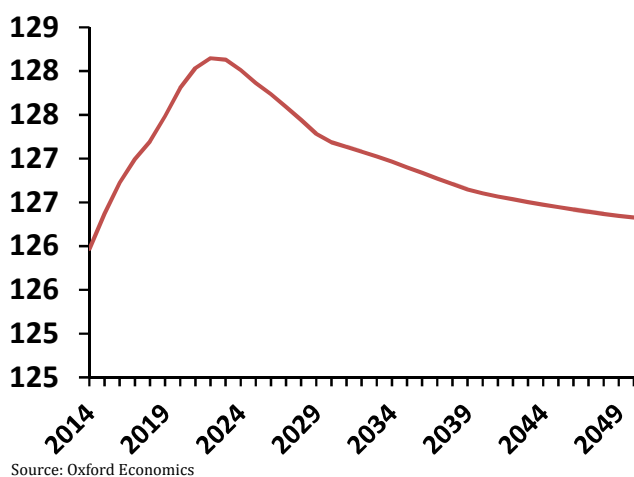


Location Quotient, Plymouth v UK, 2014

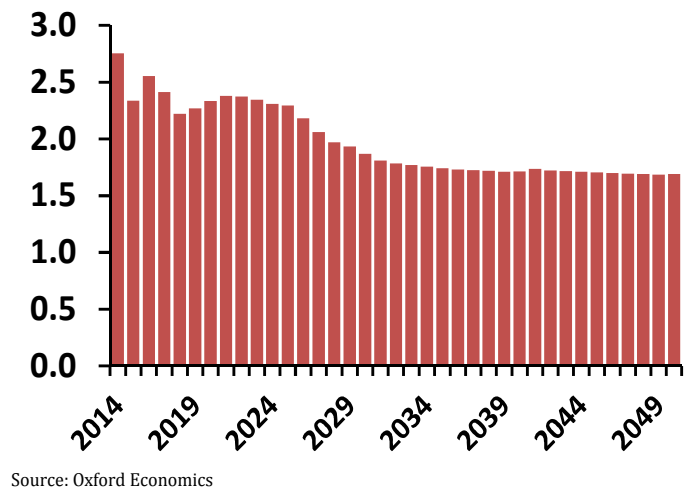


The outlook for Plymouth

Employment (000s), 2014-50

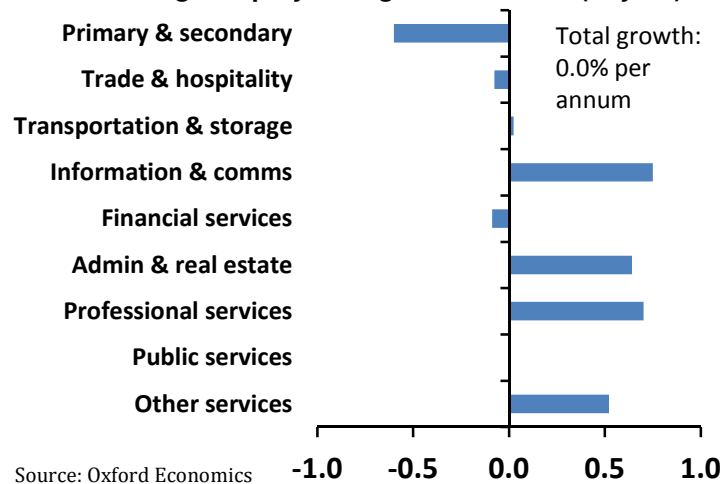


GVA growth (%), 2014-50

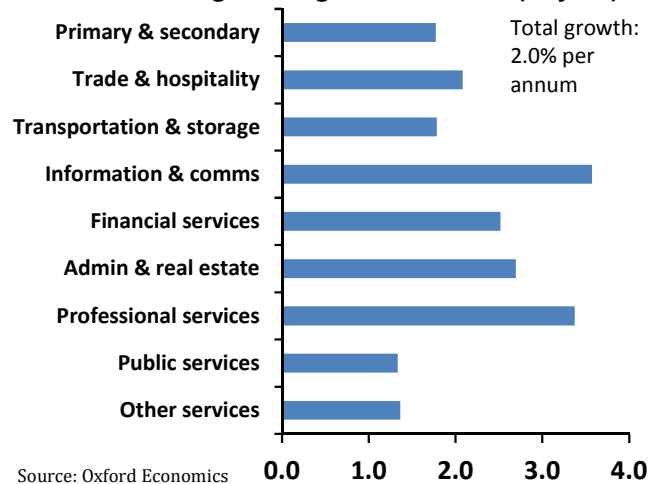


Which sectors will drive Plymouth's growth?

Annual average employment growth 2014-50 (%/year)



Annual average GVA growth 2014-50 (%/year)



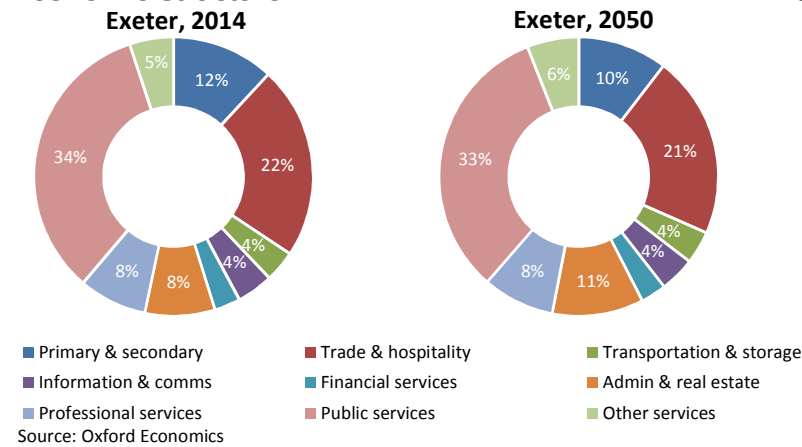
2.19 Exeter

Highlights

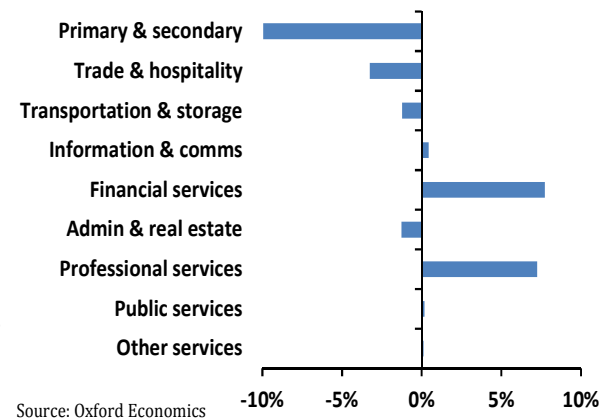
- The total population of Exeter in 2014 is estimated to be 122,000, of which 82,000 people are estimated to be of working age. Total employment is estimated at 95,500.
- The public services sector is the largest sector in Exeter. The sector accounts for over 32,000 jobs in the economy, representing 34% of the total employment level. The next largest sector, in labour market terms, is the trade and hospitality sector with 21,000 jobs.
- When compared with the UK it is evident that Exeter is much more heavily concentrated in the public services sector, with the sector accounting for 34% of total employment in Exeter compared with just 26% in the UK. Contrastingly Exeter is under-represented in the primary and secondary sector, accounting for just 12% of total employment compared with 17% in the UK.
- Population growth in Exeter over the period from 2014-2050 is expected to lag marginally behind that of the UK. Annual average growth of 0.4% is forecast in the city, compared with 0.5% in the UK. This level of growth will bring the total population of Exeter to 141,000 by 2050. The relatively slow population outlook is largely underpinned by a weak employment forecast. The rate of employment growth in Exeter is expected to average 0.3% annually to 2050, slower than the 0.4% growth forecast for the UK.
- The admin & real estate sector is forecast to enjoy the fastest rate of growth in the period 2014 to 2050. The sector is expected to generate 3,500 new jobs over the forecast period, equating to an annual average growth rate of 1.1%. The professional services sector is also set to enjoy positive growth, with 1,300 new jobs expected by 2050. The primary and secondary sector, however, is predicted to contract marginally over the period, with 400 job losses forecast by 2050.
- GVA in Exeter is predicted to reach £9.6bn by 2050, representing an annual average growth rate of 2.4%. This growth is set to be underpinned by gains in the admin & real estate sector which is expected to rise by £1.8bn during the period from 2014 to 2050. Despite the job losses forecast in the primary and secondary sector, GVA growth of 2.0% is predicted due to productivity improvements.

	Exeter			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	122	141	0.4	64,521	75,774	0.5
Employment (000's)	96	106	0.3	32,709	37,444	0.4
GVA (£m, 2010)	4,101	9,619	2.4	1,394,661	3,410,995	2.5

Economic structure

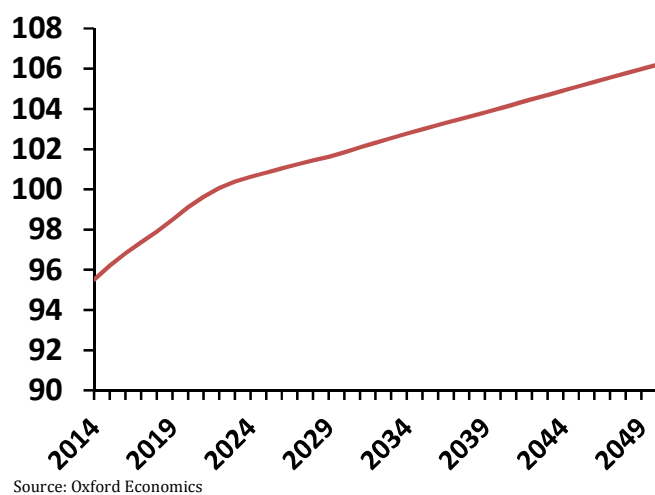


Location Quotient, Exeter v UK, 2014

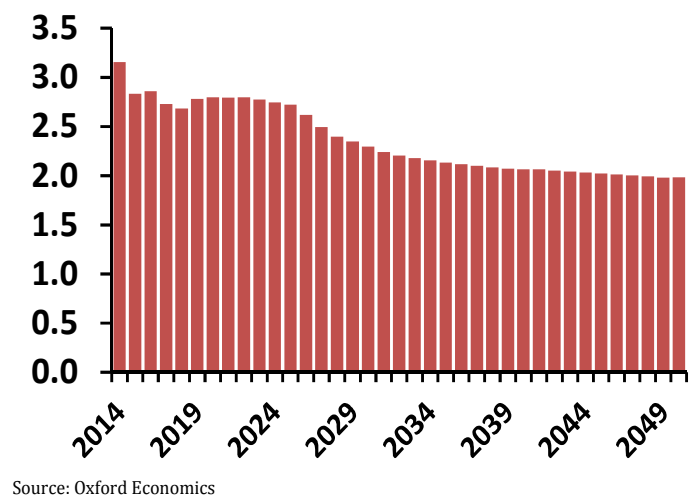


The outlook for Exeter

Employment (000s), 2014-50



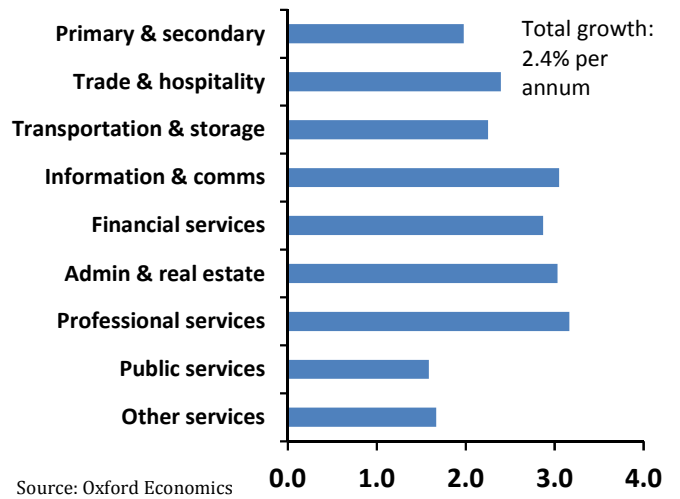
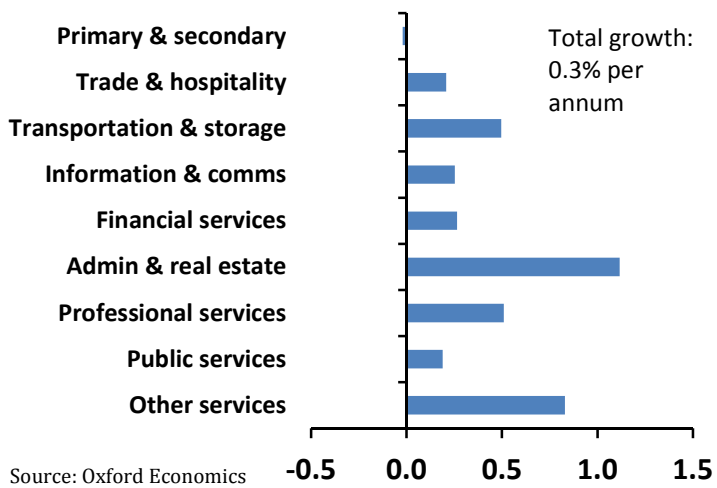
GVA growth (%), 2014-50



Which sectors will drive Exeter's growth?

Annual average employment growth 2014-50 (%/year)

Annual average GVA growth 2014-50 (%/year)



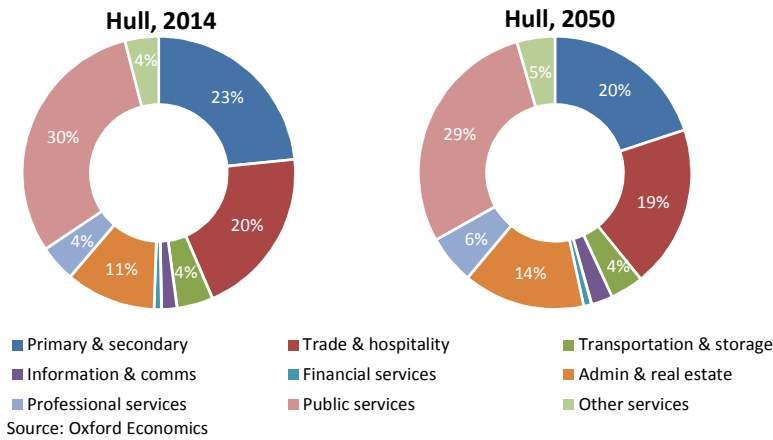
2.20 Hull

Highlights

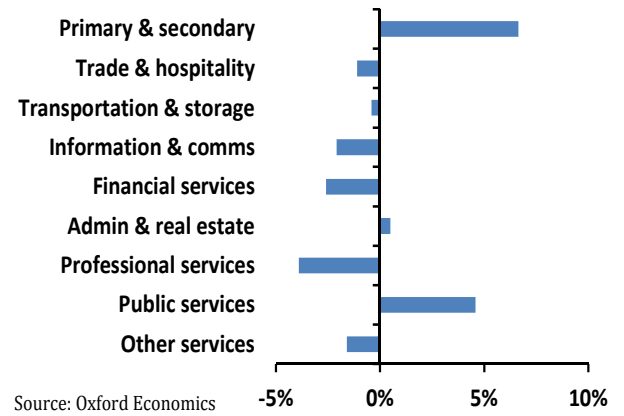
- The current population of Hull is estimated to be 258,000, with 170,000 people of working age. Total employment is estimated at 127,000 in 2014.
- At present the public services sector accounts for 30% of total employment, supporting 39,000 jobs in the economy. The trade and hospitality sector is the next largest sector, contributing 20% to the total employment level.
- The primary and secondary sector is heavily concentrated in Hull, accounting for 23% of employment relative to the national average of 17%. The public services sector is also highly represented in Hull, with a 5ppd to the UK average of 26%.
- Hull's population is expected to remain flat in the period 2014 to 2050, lagging national annual average gains of 0.5%.
- Hull's muted population outlook is largely driven by the city's employment outlook. Total employment in Hull is forecast to rise by less than 2,000 between 2014 and 2050. Growing at an annual average rate of 0.1%, just a quarter of the pace experienced by the UK.
- The admin & real estate sector is set to lead job creation, generating 5,000 additional jobs and representing annual growth of 0.9%. The primary and secondary sector by contrast is predicted to contract over the forecast period, with a total of 4,200 job losses.
- Hull is expected to add £5.1bn to output over the period 2014-2050, expanding annually at 2.1% but lagging national average growth of 2.5%. GVA growth, like employment, will be supported by the admin & real estate sector which is expected to generate £1.2bn in output, growing by 3.0% annually. Though significant job losses are expected in the primary and secondary sector over the period, it is estimated that it will also add £1.2bn of output over the period due to productivity improvements.

	Hull			UK		
	2014	2050	Avg Growth 2014-2050 (% p.a.)	2014	2050	Avg Growth 2014-2050 (% p.a.)
Population (000's)	258	258	0.0	64,521	75,774	0.5
Employment (000's)	127	129	0.1	32,709	37,444	0.4
GVA (£m, 2010)	4,790	9,896	2.1	1,394,661	3,410,995	2.5

Economic structure

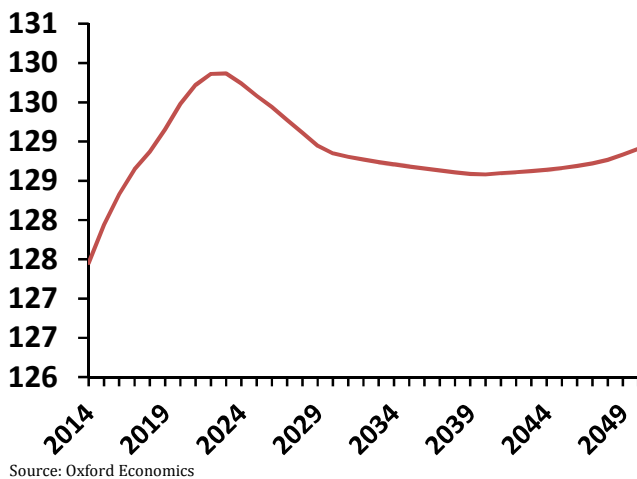


Location Quotient, Hull v UK, 2014

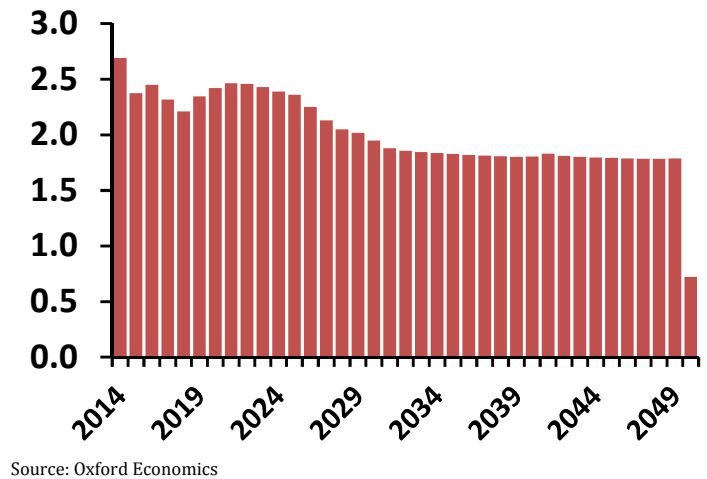


The outlook for Hull

Employment (000s), 2014-50

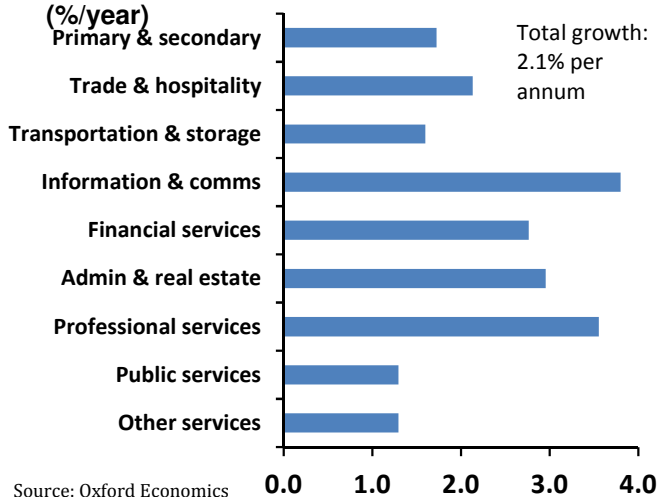


GVA growth (%), 2014-50

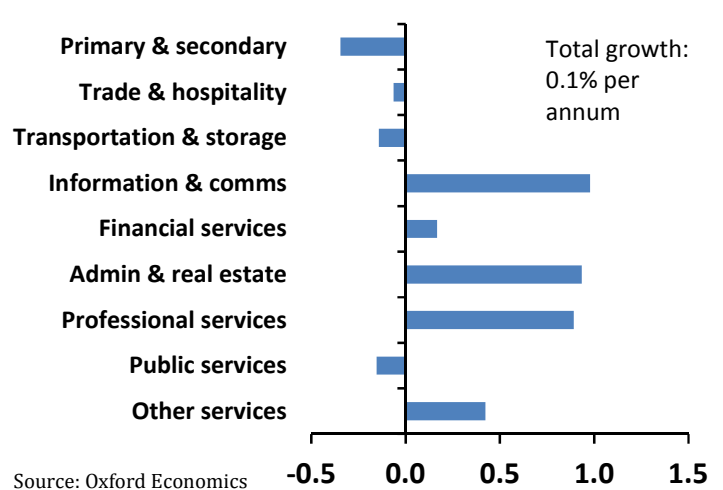


Which sectors will drive Hull's growth?

Annual average employment growth 2014-50 (%/year)



Annual average GVA growth 2014-50



3 Estimation of regional impacts

3.1 Overview

The previous chapter provided an indication of the background economic statistics for 15 selected cities.

Given this a key question is the extent to which a new London hub will assist such cities through the provision of increased connectivity both to and through London.

This work builds on Oxford Economics' past modelling of the long run effects of improvements in air connectivity and its recent work for Transport for London on A new hub airport for the UK⁵ in order to partially disaggregate national GVA impacts of improved connectivity. In doing so, it also utilises DfT forecasts and route modelling work undertaken by York Aviation in conjunction with this paper.

Key findings of this work, expressed in terms of the additional contribution to city GVA are presented in Section 3.2, below with a description of the methodological approach adopted to derive these results following this in Section 3.3

3.2 Key findings

Key findings of the impacts of a new London hub airport on the 15 cities of interest to this study are presented below. These describe the boost to GVA resulting from the improved connectivity offered by such an airport in 2050. Additionally, industry breakdowns are provided for each city to illustrate the relative allocation of these effects within the respective cities.

This boost to GVA represents an improvement in productivity – which is key to growth and improved living standards in the long run. As per the methodology previously documented by Oxford Economics (2013) *Impacts on the UK Economy through provision of International Connectivity* the GVA boost is derived from an increase in business and air freight trips due to improved connectivity, rather than tourism trips (which are not assumed to add to long run productivity).

Note that it is assumed that the improved connectivity does not result in reduced unemployment in the long run. This is because in the long run it is assumed that the economy essentially operates at full capacity.

However, rising GVA implies, among other things, increases in local living standards and in wages. In total it is estimated that the development of a London

⁵ See <http://www.tfl.gov.uk/corporate/about-tfl/how-we-work/planning-for-the-future/a-new-hub-airport-for-the-uk?cid=fs124> In particular this work draws on the methodology detailed in Oxford Economics (2013) *Impacts on the UK Economy through provision of International Connectivity*

hub airport will provide £2,226 million (in £ 2010 terms) in additional GVA to the 15 cities of interest in 2050.

These results are intended to be illustrative only. In practice, as business trips would also be drawn from surrounding areas, some benefits would also be captured by areas outside the immediate city local authorities, although it is likely that much of the business activity which utilises air travel would be concentrated within city centres. Also note that the GVA estimates are, in part, also based on freight estimates, which, in turn, are more precisely based on the central local authority district's relative share of GVA, as described below.

All figures are presented in real terms (£2010).

Table 3.1: GVA impacts of new London hub – selected cities

City	Impact on GVA 2050 (£m 2010)
Aberdeen	335
Edinburgh	437
Glasgow	346
Belfast	89
Newcastle	62
Manchester	64
Leeds/Bradford	100
Highlands (Inverness)	64
Dundee	135
Durham/Middleborough	213
Liverpool	116
Cardiff	54
Restormel (Newquay)	32
Plymouth	32
Hull	146
Total	2,226

NB: Numbers may not add precisely to total due to rounding.

The following tables provide a breakdown of these benefits in terms of the industrial structure of each central local authority district. This draws on the relevant composition of the local authority district industries, as well as allowing for the different relative spends of those industries on air transport.

Table 3.2: GVA impacts by industry – Aberdeen

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	0
Mining and quarrying	91
Manufacturing	16
Electricity, gas, steam and air conditioning supply	0
Water supply; sewerage, waste management and remediation activities	0
Construction	2
Wholesale and retail trade; repair of motor vehicles and motorcycles	11
Transportation and storage	41
Accommodation and food service activities	2
Information and communication	30
Financial and insurance activities	48
Real estate activities	25
Professional, scientific and technical activities	37
Administrative and support service activities	22
Public administration and defence; compulsory social security	1
Education	2
Human health and social work activities	6
Arts, entertainment and recreation	1
Other service activities	1
Total	335

NB: Numbers may not add precisely to total due to rounding.

Table 3.3: GVA impacts by industry – Edinburgh

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	0
Mining and quarrying	1
Manufacturing	2
Electricity, gas, steam and air conditioning supply	0
Water supply; sewerage, waste management and remediation activities	0
Construction	1
Wholesale and retail trade; repair of motor vehicles and motorcycles	7
Transportation and storage	26
Accommodation and food service activities	2
Information and communication	39
Financial and insurance activities	303
Real estate activities	21
Professional, scientific and technical activities	17
Administrative and support service activities	11
Public administration and defence; compulsory social security	1
Education	1
Human health and social work activities	3
Arts, entertainment and recreation	1
Other service activities	1
Total	437

NB: Numbers may not add precisely to total due to rounding.

Table 3.4 GVA impacts by industry – Glasgow

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	0
Mining and quarrying	0
Manufacturing	8
Electricity, gas, steam and air conditioning supply	0
Water supply; sewerage, waste management and remediation activities	0
Construction	2
Wholesale and retail trade; repair of motor vehicles and motorcycles	10
Transportation and storage	27
Accommodation and food service activities	1
Information and communication	38
Financial and insurance activities	175
Real estate activities	37
Professional, scientific and technical activities	14
Administrative and support service activities	25
Public administration and defence; compulsory social security	1
Education	1
Human health and social work activities	4
Arts, entertainment and recreation	1
Other service activities	1
Total	346

NB: Numbers may not add precisely to total due to rounding.

Table 3.5: GVA impacts by industry – Belfast

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	-
Mining and quarrying	0
Manufacturing	1
Electricity, gas, steam and air conditioning supply	0
Water supply; sewerage, waste management and remediation activities	0
Construction	0
Wholesale and retail trade; repair of motor vehicles and motorcycles	3
Transportation and storage	7
Accommodation and food service activities	0
Information and communication	19
Financial and insurance activities	42
Real estate activities	7
Professional, scientific and technical activities	3
Administrative and support service activities	5
Public administration and defence; compulsory social security	1
Education	0
Human health and social work activities	1
Arts, entertainment and recreation	0
Other service activities	0
Total	89

NB: Numbers may not add precisely to total due to rounding.

Table 3.6: GVA impacts by industry – Newcastle

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	0
Mining and quarrying	-
Manufacturing	2
Electricity, gas, steam and air conditioning supply	0
Water supply; sewerage, waste management and remediation activities	0
Construction	0
Wholesale and retail trade; repair of motor vehicles and motorcycles	2
Transportation and storage	7
Accommodation and food service activities	0
Information and communication	13
Financial and insurance activities	24
Real estate activities	5
Professional, scientific and technical activities	3
Administrative and support service activities	4
Public administration and defence; compulsory social security	0
Education	0
Human health and social work activities	1
Arts, entertainment and recreation	0
Other service activities	0
Total	62

NB: Numbers may not add precisely to total due to rounding.

Table 3.7: GVA impacts by industry – Manchester

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	0
Mining and quarrying	-
Manufacturing	1
Electricity, gas, steam and air conditioning supply	0
Water supply; sewerage, waste management and remediation activities	0
Construction	0
Wholesale and retail trade; repair of motor vehicles and motorcycles	1
Transportation and storage	9
Accommodation and food service activities	0
Information and communication	10
Financial and insurance activities	32
Real estate activities	4
Professional, scientific and technical activities	3
Administrative and support service activities	3
Public administration and defence; compulsory social security	0
Education	0
Human health and social work activities	1
Arts, entertainment and recreation	0
Other service activities	0
Total	64

NB: Numbers may not add precisely to total due to rounding.

Table 3.8: GVA impacts by industry – Leeds/Bradford

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	0
Mining and quarrying	0
Manufacturing	4
Electricity, gas, steam and air conditioning supply	0
Water supply; sewerage, waste management and remediation activities	0
Construction	0
Wholesale and retail trade; repair of motor vehicles and motorcycles	3
Transportation and storage	10
Accommodation and food service activities	0
Information and communication	16
Financial and insurance activities	48
Real estate activities	7
Professional, scientific and technical activities	4
Administrative and support service activities	4
Public administration and defence; compulsory social security	0
Education	1
Human health and social work activities	1
Arts, entertainment and recreation	0
Other service activities	0
Total	100

NB: Numbers may not add precisely to total due to rounding.

Table 3.9: GVA impacts by industry – Inverness (Highlands)

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	0
Mining and quarrying	1
Manufacturing	4
Electricity, gas, steam and air conditioning supply	0
Water supply; sewerage, waste management and remediation activities	0
Construction	1
Wholesale and retail trade; repair of motor vehicles and motorcycles	3
Transportation and storage	15
Accommodation and food service activities	1
Information and communication	10
Financial and insurance activities	12
Real estate activities	7
Professional, scientific and technical activities	3
Administrative and support service activities	4
Public administration and defence; compulsory social security	1
Education	1
Human health and social work activities	2
Arts, entertainment and recreation	0
Other service activities	0
Total	64

NB: Numbers may not add precisely to total due to rounding.

Table 3.10: GVA impacts by industry – Dundee

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	0
Mining and quarrying	0
Manufacturing	6
Electricity, gas, steam and air conditioning supply	0
Water supply; sewerage, waste management and remediation activities	0
Construction	1
Wholesale and retail trade; repair of motor vehicles and motorcycles	7
Transportation and storage	13
Accommodation and food service activities	1
Information and communication	29
Financial and insurance activities	45
Real estate activities	13
Professional, scientific and technical activities	5
Administrative and support service activities	5
Public administration and defence; compulsory social security	1
Education	2
Human health and social work activities	4
Arts, entertainment and recreation	1
Other service activities	0
Total	135

NB: Numbers may not add precisely to total due to rounding.

Table 3.11: GVA impacts by industry – Durham/Middlesbrough

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	0
Mining and quarrying	0
Manufacturing	9
Electricity, gas, steam and air conditioning supply	-
Water supply; sewerage, waste management and remediation activities	1
Construction	4
Wholesale and retail trade; repair of motor vehicles and motorcycles	14
Transportation and storage	25
Accommodation and food service activities	2
Information and communication	35
Financial and insurance activities	51
Real estate activities	29
Professional, scientific and technical activities	7
Administrative and support service activities	18
Public administration and defence; compulsory social security	4
Education	4
Human health and social work activities	8
Arts, entertainment and recreation	1
Other service activities	1
Total	213

NB: Numbers may not add precisely to total due to rounding.

Table 3.12: GVA impacts by industry – Liverpool

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	0
Mining and quarrying	0
Manufacturing	2
Electricity, gas, steam and air conditioning supply	0
Water supply; sewerage, waste management and remediation activities	0
Construction	0
Wholesale and retail trade; repair of motor vehicles and motorcycles	5
Transportation and storage	15
Accommodation and food service activities	1
Information and communication	27
Financial and insurance activities	41
Real estate activities	10
Professional, scientific and technical activities	4
Administrative and support service activities	7
Public administration and defence; compulsory social security	1
Education	1
Human health and social work activities	2
Arts, entertainment and recreation	0
Other service activities	0
Total	116

NB: Numbers may not add precisely to total due to rounding.

Table 3.13: GVA impacts by industry – Cardiff

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	0
Mining and quarrying	0
Manufacturing	1
Electricity, gas, steam and air conditioning supply	0
Water supply; sewerage, waste management and remediation activities	0
Construction	0
Wholesale and retail trade; repair of motor vehicles and motorcycles	2
Transportation and storage	4
Accommodation and food service activities	0
Information and communication	6
Financial and insurance activities	31
Real estate activities	5
Professional, scientific and technical activities	1
Administrative and support service activities	3
Public administration and defence; compulsory social security	0
Education	0
Human health and social work activities	1
Arts, entertainment and recreation	0
Other service activities	0
Total	54

NB: Numbers may not add precisely to total due to rounding.

Table 3.14: GVA impacts by industry – Restormel (Newquay)

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	0
Mining and quarrying	0
Manufacturing	2
Electricity, gas, steam and air conditioning supply	-
Water supply; sewerage, waste management and remediation activities	0
Construction	1
Wholesale and retail trade; repair of motor vehicles and motorcycles	2
Transportation and storage	6
Accommodation and food service activities	1
Information and communication	2
Financial and insurance activities	5
Real estate activities	6
Professional, scientific and technical activities	2
Administrative and support service activities	2
Public administration and defence; compulsory social security	0
Education	0
Human health and social work activities	1
Arts, entertainment and recreation	0
Other service activities	0
Total	32

NB: Numbers may not add precisely to total due to rounding.

Table 3.15: GVA impacts by industry – Plymouth

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	0
Mining and quarrying	0
Manufacturing	3
Electricity, gas, steam and air conditioning supply	0
Water supply; sewerage, waste management and remediation activities	0
Construction	0
Wholesale and retail trade; repair of motor vehicles and motorcycles	2
Transportation and storage	5
Accommodation and food service activities	0
Information and communication	4
Financial and insurance activities	9
Real estate activities	4
Professional, scientific and technical activities	1
Administrative and support service activities	2
Public administration and defence; compulsory social security	1
Education	0
Human health and social work activities	1
Arts, entertainment and recreation	0
Other service activities	0
Total	32

NB: Numbers may not add precisely to total due to rounding.

Table 3.16: GVA impacts by industry – Hull

Industry	Impact on GVA 2050 (£m 2010)
Agriculture, forestry and fishing	0
Mining and quarrying	0
Manufacturing	21
Electricity, gas, steam and air conditioning supply	-
Water supply; sewerage, waste management and remediation activities	0
Construction	2
Wholesale and retail trade; repair of motor vehicles and motorcycles	10
Transportation and storage	25
Accommodation and food service activities	1
Information and communication	23
Financial and insurance activities	25
Real estate activities	13
Professional, scientific and technical activities	6
Administrative and support service activities	14
Public administration and defence; compulsory social security	1
Education	1
Human health and social work activities	4
Arts, entertainment and recreation	0
Other service activities	0
Total	146

NB: Numbers may not add precisely to total due to rounding.

3.3 Description of approach

As indicated, the work undertaken for the current study is based on the modelling approach adopted in Oxford Economics (2013).

This work builds on Oxford Economics past modelling of the long run effects of improvements in air connectivity and its recent work for Transport for London on A new hub airport for the UK In particular this work draws on the methodology detailed in Oxford Economics (2013) *Impacts on the UK Economy through provision of International Connectivity* ("the 2013 study")

The modelling approach adopted in that study involved the construction of an index of connectivity which measured the benefits generated by an increase in business passengers and freight. Benefits were measured in terms of total factor productivity (or TFP) which, in turn, allowed for an estimate in terms of GDP, although the (very similar) measure of GVA has been used in the case of the current study.

The 2013 study used DfT forecasts of constrained and unconstrained demand in 2050 along with separate freight modelling work undertaken by Oxford

Economics for TfL⁶ to determine the increase in national business and freight connectivity offered by a new hub airport.

The same connectivity model has been adopted for the current study, however rather than GVA results at the national level; the concern here is with the distribution of GVA to designated urban centres. The benefit to such centres is effectively a sub-set of the national benefit calculated in the 2013 study and likewise, the connectivity index contribution of such urban centres can be thought of as a sub-set of the overall national connectivity index.

Accordingly, the following approach was adopted to determine such benefits.

- Data provided in DfT (2013) *UK Aviation Forecasts* allowed for the comparison of the constrained and unconstrained point to point domestic business travel in 2050⁷. DfT modelling suggests that the loss of domestic business trips when constrained forecasts are compared to unconstrained ones is some 380,000. Conversely 380,000 point to point domestic business trips are gained through an unconstrained scenario. (This figure was halved to calculate actual regional benefit figures to allow for the fact that London and the south east might capture up to half the benefits of these extra trips.)
- Separate considerations apply to domestic passengers who connect to or from international flights. DfT (2013) suggests that some 9.6 million fewer passengers make such transfers under a constrained model, relative to an unconstrained one. As such data also suggest that in 2050 8% of such transfer passengers are business passengers, this implies a “raw” loss of 740,000 connecting business passengers.
- However some passengers would divert to foreign hubs instead. DfT (2013) suggests that 1.4 million *more* UK passengers (regardless of their UK origin) transfer at foreign hubs (which are not assumed to be constrained) in the UK constrained case than was the situation in 2010. If it is assumed that **all** of this growth was due to former UK domestic-international connecting passengers switching to connect at overseas hubs then the net loss in connecting passengers is 8.2 million with roughly 640,000 fewer business passengers.
- It is likely the true situation is between these two extremes, with some business passenger transfers not switching to overseas hubs at all (i.e. not making trips) and others switching. Taking the midpoint between these two estimates suggests a loss of connecting business passengers of 690,000 by 2050 under a constrained scenario relative to an unconstrained one.
- Combining these two components implies a loss of just under 1.1 million point to point and connecting domestic business passengers by 2050 under the constrained scenario. (This compares to a total loss of 3.5 million business passengers in 2050 when comparing the two scenarios on a

⁶ Detailed in Oxford Economics (2013) *Impacts on the Air Freight Industry, Customers and Associated Business Sectors*

⁷ The DfT’s central constrained and unconstrained scenarios have been used for the modelling below.

national basis.) Conversely, an unconstrained scenario implies a 1.1 million gain in business passengers. (As indicated however, the actual calculation of regional benefits halved the number of point to point passengers.)

- The contribution of the freight traffic component was determined by the (combined) proportion of GVA of the 15 designated local authorities relative to national GVA (roughly 10%). Accordingly, some 10% of the freight benefits assessed for the national model were attributed to the 15 local authorities in question.

Combining the regional business passenger and freight estimates into a regional component of the connectivity index and recalibrating the model suggested an increase of 1.3% in Oxford Economics' combined business passenger and freight connectivity index attributable to the 15 designated cities. (This compares to an increase of 9% when allowing for the full national effects, as described in the 2013 study). Given connectivity elasticity relative to GDP of 0.05 referred to in the 2013 study, this suggests a change in GDP – or in this case GVA – of 0.065%. Oxford Economics currently forecasts UK GVA as some £3,411 billion in 2050 (expressed in 2010 prices), implying a regional contribution of £2.2 billion.

Separate modelling of domestic and domestic connecting passenger flows in the event of a new London hub (compared to a constrained base) for each of the 15 cities was carried out by York Aviation. This allowed for the distribution of the total regional GVA benefits according to the relative increase in passenger volumes enjoyed by each of the cities. This formed the basis of the estimates in Table 3.1 above.

In order to determine the relative allocation of GVA gains to industries within a given city the following approach was taken

- The estimated GVA gain by each city was multiplied by the relative percentage contribution to city GVA by each industry.
- This figure was then reweighted to account for the fact that industries have different relative spends on air transport services. Industry spend on air transport per employee relative to an all industries average was used for this purpose⁸. Relative industry spend per employee data utilised in the 2013 study and earlier work was used for this purpose.

The results of these calculations are provided in Tables 3.2 – 3.16.

⁸ This relative industry spend data was developed for Oxford Economic Forecasting (2006) *The Economic Contribution of the Aviation Industry in the UK* and also utilised in Oxford Economics (2013)

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