



Expanding Airport Capacity: Competition and Connectivity

The case of Gatwick and Heathrow



Country-Specific Policy Analysis

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THE INTERNATIONAL TRANSPORT FORUM

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Acknowledgement

seo economic research

The analysis for this report was undertaken by SEO Economic Research. The SEO team comprised Guillaume Burghouwt, Joop Krul and Jan Veldhuis together with external advisors Jaap de Wit (University of Amsterdam) and John Jamotta (former VP Network Planning at Southwest Airlines).

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Executive summary

In December 2013 the UK Airports Commission short-listed three options for airport expansion in the UK, two at Heathrow and one at Gatwick¹. The Commission is currently in the process of assessing these options. A report with the Commission's assessments will be published for national consultation in the autumn of 2014.

Against this background, UK Airports Commission and the International Transport Forum requested SEO Economic Research to carry out a study to determine how each of the short-listed expansion options may affect on the competitive nature of the London and UK-wide airport system.

The study is designed to answer the question what factors or combination of factors will drive - in the context of additional capacity in the South East airports system - the most "competitive" outcome for each of the expansion options. The study aims to provide the Airports Commission with an evidence-based assessment to scrutinise the airport capacity expansion options in regard to their competitive outcomes, connectivity and overall user benefits. More specifically, the study answers the following questions:

1. Which factors affect decisions and behaviour of airlines in the UK airport system?
2. How are airlines likely to respond as a result of adding additional capacity to either Gatwick or Heathrow?
3. What is the "competitive outcome" of the airline responses in terms of connectivity and competition to the benefit of aviation users?
4. How likely are the airline responses in various future scenarios?

For the purpose of this work, the two Heathrow expansion proposals short-listed by the Airports Commission have been grouped together as one "Heathrow" option.

Factors affecting airline behaviour

A multitude of factors drive airline behaviour in the London airport system but impacts on the financial performance of airlines matter most.

Airlines try to maximize their financial return on invested capital and airline managers have to meet financial targets. Growth of the network is generally only possible when financial targets are being met. Underlying factors that drive airline network behaviour and financial performance include size and

¹ At the time of writing of this report, the Commission had made the decision not to shortlist the Estuary option. More information on this decision can be found here: <https://www.gov.uk/government/news/airports-commission-announces-inner-thames-estuary-decision>.

strength of the local market, airport visit costs, congestion costs, advantages of spatial concentration, service levels and access to capacity.

Size and strength of the local market is of primary importance for all airline segments.

For all airline market segments, the size and strength (yield) of the local market is of primary importance. The London local OD market is the largest and strongest in the world. Non-home based network carriers, low-cost carriers, leisure/ charter carriers and home based legacy point-to-point carriers fully depend on the size and strength of the local OD market from and to London. Only hub carriers like British Airways and its partners at Heathrow are able to really ‘extend’ the local market by carrying transfer traffic via their hub. Due to the specific user requirements of the hub carrier (peak-hour capacity, minimum connecting time) and characteristics of its business model, the hub carrier is currently captive to the Heathrow location. This might change if Gatwick were to increase its capacity.

Low-cost, leisure and cargo traffic is sensitive to visit and congestion costs.

Low-cost, leisure carriers and all-cargo airlines are relatively sensitive to visit and congestion costs. For them, the charges are a considerable part of their operating costs. Traffic rights, peak-hour capacity, short connecting times and network concentration are less relevant to their airport choice behaviour. Stansted, Luton and Gatwick are in particular attractive to low-cost and leisure carriers given their much lower charges levels than City and Heathrow. The large local market for leisure traffic makes Gatwick in particular attractive for leisure/ charter carriers, higher end low-cost carriers and legacy point-to-point airlines.

Expansion of Heathrow or Gatwick will ultimately result in an increase in charges at the expanded airport.

Airport charges are likely to increase following Heathrow or Gatwick expansion. At capacity constrained airports with substantial excess demand, capacity expansion will result in a decrease in airline scarcity rents, with lower fares for consumers. Airlines are unlikely to increase airfares because of higher charges. Instead, higher charges will combine with the fall in scarcity rents to reduce airline margins.

Carriers tend to spatially concentrate network growth.

The scale and scope economies of network concentration, including the effect of increased frequencies more than proportionately increasing market share (the “S-curve” effect) are important reasons why network carriers tend to concentrate network growth at a single location in cities served by more than one airport. Network economies are the reason network carriers concentrate their network at a hub, but that does not imply that every network carrier operates only one hub in their network. There can be reasons for a hub carrier to deviate from the single hub solution. Adding capacity to Gatwick might allow for a secondary, competing hub operation but a split hub operation by British Airways at both Heathrow and Gatwick is not likely to be an efficient network solution.

Airline responses as a result of adding capacity at Gatwick or Heathrow

Based on an analysis of the London airports system, key drivers for airline behaviour and the options for capacity expansion at either Gatwick or Heathrow, we have developed 6 different sets of potential airline responses, 3 for Gatwick and 3 for Heathrow. The airline responses have a varying impact on the traffic structure in the London airport system as well as on connectivity, competition and reduction of airline scarcity rents to the benefit of consumers.

Airline response 1: Hub carrier growth at Heathrow, point-to-point growth at Gatwick.

The first airline response assumes capacity expansion at Heathrow. The additional capacity enables the hub carrier BA (and partners) to grow from today's constrained, sub-optimal hub operation to a more efficient wave system for coordinating arrivals and departures. Larger, more clearly defined banks of arriving and departing flights will make it possible for a higher number of transfer passengers to connect at Heathrow. Other non-home-based network carriers such as Delta and Emirates could also increase connections from Heathrow to their own hubs, as well as legacy point-to-point carriers such as Virgin Atlantic. Low-cost remains focused at Gatwick and the other London airports.

Airline response 2: Two hub operations at Heathrow, point-to-point growth at Gatwick.

Again assuming Heathrow expansion, a competing network carrier develops a hub operation at Heathrow besides BA and partners, benefiting from the strength of the London OD market. The new hub operation is likely to be of a smaller size than that of the existing hub carrier. Establishing a competing hub operation at Heathrow would be a risky strategy due to head-to-head competition with the incumbent hub carrier, the expected rise in charges and the reduction in economic rents for airlines following capacity expansion. In this airline response, the current hub carrier and partners expand their network along the lines of airline response 1, albeit to a smaller extent. Existing or new non-home-based network carriers increase long-haul and possibly short-haul services out of Heathrow. Low-cost and leisure carriers, as under airline response 1, remain focussed at Gatwick and other London airports.

Airline response 3: Point-to-point growth at Heathrow and Gatwick, Heathrow remains the network hub.

A third possible airline response following Heathrow expansion is growth of point-to-point traffic at both Heathrow and Gatwick. This assumes a saturating European low-cost, point-to-point market, where low-cost carriers search for premium traffic at Heathrow. Despite the much higher charges at Heathrow, low-cost airlines establish a significant operational base at Heathrow to target the premium market, while keeping up their operations at Gatwick. Additional slots are taken up by visiting network carriers and legacy point-to-point carriers.

Airline response 4: Hub operation at Heathrow and a competing hub operation at Gatwick.

As the London market is one of the largest and strongest aviation markets in the world, the Gatwick capacity expansion option could trigger an incumbent, non-Oneworld UK carrier or a foreign network carrier to use the new capacity to establish a hub operation at Gatwick. A hub operation at Gatwick could potentially benefit from lower charges in comparison Heathrow charges. On the other hand, yields at Gatwick are lower than at Heathrow and foreseen growth in peak capacity at Gatwick would most likely be taken up by a smaller scale hub operation. BA and partners continue their hub operations from Heathrow. The growing scarcity of capacity at Heathrow increases the opportunity costs of slots and results in a continuation of the crowding out of short-haul and low yield flights from Heathrow. The focus of Heathrow is increasingly on long haul, high capacity flights with a growing share of local OD traffic. The legacy point-to-point segment at Gatwick is likely to grow modestly with more routes served. Low-cost and leisure carriers continue to operate out of Gatwick and benefit from the increase in capacity

Airline response 5: Partnerships – Gatwick becomes a low-cost “gateway”, Heathrow remains the network hub.

Again assuming Gatwick expansion, legacy network carriers and/ or low-cost carriers (of which some start to operate in the long-haul market) partner to facilitate passenger connectivity. This could take

place either through a new alliance/ codeshare formula or by an airport-led connection strategy. Low-cost grows significantly at Gatwick. Long-haul low-cost flourishes at Gatwick given the large local OD market and strong growth in the inbound long-haul leisure market from Asia, as well as the potential for low-cost and full-service feed. Due to the nature of the low-cost business model, such an airline response will lead to relatively lower numbers of connecting passengers at the airport, as low-cost carriers will try to avoid the complexity of a wave-system structure for arrivals and departures. Hence, the share of transfer traffic will remain limited, in the range of 10-20% maximum, and will not reach the levels of a typical hub airport. The hub carrier and partners at Heathrow develop along the lines of airline response 4. Non-Oneworld long-haul carriers increasingly focus network growth at Gatwick, benefiting from feed provided by low-cost carriers and availability of capacity.

Airline response 6: Gatwick point-to-point growth, Heathrow remains the network hub.

Instead of developing Gatwick into a low-cost gateway following capacity expansion at Gatwick, where point-to-point traffic is mixed with connecting traffic, this airline response assumes that low-cost carriers take up most of the capacity at Gatwick but stick to a typical low-cost carrier business model without a deliberate strategy to stimulate connecting traffic and achieve additional route density and connectivity. The growth of low-cost carriers at Gatwick comprises partly “autonomous growth” and, depending on the future level of aero-charges, partly migration of flights from Stansted and Luton to Gatwick. A number of low-cost, long-haul destinations are assumed to be developed, based on the growing inbound leisure market from Asia. Over time, an increasing share of the additional capacity at Gatwick will be used by carriers that currently operate at Heathrow but find more cost effective options at Gatwick when capacity becomes available. This may free-up some capacity at Heathrow, which can be used by the hub carrier and other network carriers. Over time, as capacity shortages remain at Heathrow, the focus at Heathrow will increasingly be on high-capacity flights to large long-haul destinations with increasing shares of OD demand. Crowding out will take place with respect to short-haul flights at Heathrow in the long run.

Impact on the “competitive outcome”

The different airline responses have varying impacts on the “competitive outcome” in terms of connectivity, competition and reduction of airline rents to the benefit of the consumer:

- Connectivity is expected to improve most when the hub carrier at Heathrow uses new capacity to reinforce its hub system, as the possibility to generate long-haul route density on top of local OD demand is largest. Multiple (competing) hub operations within the London airport system would also stimulate connectivity but to a smaller extent, because of the multiplier-effect of hub-and-spoke networks: one large hub delivers more connectivity than two hubs half the size. Higher airport charges in the future resulting from airport expansion may reach levels that might prevent the hub carrier at Heathrow developing a hub operation with the same extensive feeder network as, for example, at Frankfurt and Amsterdam. It remains to be seen to what extent hub expansion at Gatwick or Heathrow would result in more capacity on existing routes as opposed to adding new routes.
- An airline response where network carriers and/ or low-cost carriers partner to facilitate connectivity may increase connectivity as well (airline response 5), but this gain will be limited based on current airline business models. This may change as airline business models evolve.
- Not expanding Heathrow is likely to result in further crowding out of short-haul/ lower yield flights at Heathrow as excess demand increases, as well as a further rise in air fares. Over time,

short-haul/ lower yield flights are substituted with long haul, high capacity flights. The role of Gatwick, Stansted, Luton and City for short-haul connectivity will then increase.

- Differences between the different sets of airline responses in terms of gains in short-haul connectivity for the London airports system are likely to be much smaller than they are for long haul connectivity. The relevance of connecting traffic to operating high frequency routes profitably is small in the short-haul market and the overall size of the market for short-haul routes is much larger.
- In terms of reduction of scarcity rents and connectivity gains, a UK consumer is likely to gain most by expanding Heathrow. With severe capacity constraints and high yield demand, the scarcity rents can be expected to be largest there. Hence, reduction of excess demand following Heathrow expansion is likely to reduce fares more than following Gatwick expansion. Furthermore, connectivity gains are likely to be highest for Heathrow expansion, with growth of the hub carrier.
- Expansion of Gatwick is likely to have the strongest positive impacts on competition, with benefits to the consumer due to the expected increase in low-cost carrier competition and a less dominant position of a single alliance, resulting in more choice for the consumer and lower fares.
- However, it is not clear what the overall, combined impact on consumer welfare would be of changing scarcity rents, connectivity growth and changes in competition level as a result of expanding Gatwick or Heathrow.

Likelihood of the airline responses

The way macroeconomic conditions develop over the long term will affect the likelihood of the airline responses examined unfolding. Some of the responses are unlikely under some scenarios. Airline business models evolve, macro-economic conditions change and new aircraft technology will be on the market when new capacity becomes available.

Confronting the six sets of airline responses with the future scenarios developed by the Airports Commission, we draw the following main conclusions:

- Overall, hub carrier growth following Heathrow expansion and development of Gatwick into a low-cost gateway following Gatwick expansion are the most likely airline responses under the various macroeconomic scenarios developed by the Airports Commission.
- In the Assessment of Need scenario, hub carrier growth following Heathrow expansion and Gatwick as a point-to-point gateway following Gatwick expansion seem to be most realistic airline responses, although the other response options are each also moderately likely.
- In the Global Growth scenario, most airline responses are likely except for an expanded Heathrow with predominantly pure point-to-point, low-cost growth. Strong network carriers may have a substantial interest in an expanded Gatwick in a high growth market, given the capacity shortages at Heathrow. The multi-hub airline responses (2 and 4) seem only to be realistic in the Global Growth scenario.

- In the Relative Decline of Europe scenario, no multi-hub scenario is likely as the political will to accommodate hub operations from Middle East or Far East carriers will diminish as these carriers gain market share and put pressure on the European carriers. We expect the hub carrier British Airways to focus on protecting its position at Heathrow as much as possible if Heathrow is expanded but strong, non-European hub carriers will cannibalize its market. Connections via non-EU hubs are likely to increase. In case of expansion of Gatwick, Middle East and Asian carriers may team up with European low-cost carriers to organize feed for their long-haul flights.
- The Low Cost is King scenario is likely to rule out multi-hub airline responses (responses 2 and 4). In case of expansion of Gatwick, a hybrid hub operation could be one of the realistic futures, in which low-cost and legacy airlines partner to provide connectivity.
- The Global Fragmentation scenario will most likely result in hub carriers rationalizing their networks and focusing on their primary hubs. As the market stalls, the hub carrier may not be able to develop its hub network to the full extent made possible by expansion of Heathrow. In the case of expansion of Gatwick, a point-to-point response is likely.

We note that airline response 2 (two hubs at Heathrow) may involve too much financial risk for the new hub carrier and would not be realistic except possibly in the Global Growth scenario. The lower yields at Gatwick and suboptimal peak-hour capacity also make the establishment of a competing hub operation at Gatwick less likely (airline response 4)

1. Introduction

Against the background of the assessment of the short-listed airport capacity expansion options of the UK Airports Commission, this report analyses the potential consequences for airline behaviour in case one of the short-listed options would be implemented. In addition, the study discusses potential implications of expansion at each airport for connectivity and competition to the benefit of the aviation user. Finally, the study assesses the likelihood of different airline responses under the different scenarios identified by the Airports Commission.

1.1 Background and objective of the study

In December 2013 the UK Airports Commission short-listed three options for airport expansion in the UK, two at Heathrow and one at Gatwick². The Commission is currently in the process of assessing these options. A report with the Commission’s assessments will be sent out for national consultation in the autumn of 2014.

Against this background, UK Airports Commission and the International Transport Forum requested SEO Economic Research to carry out a study to determine how each of the short-listed expansion options may impact on the competitive nature of the London and UK-wide airport system.

The study is designed to answer the question what factors or combination of factors will drive - in the context of additional capacity in the South East airports system - the most “competitive” outcome for each of the expansion options. The study aims to provide the Airports Commission with an evidence-based assessment to scrutinise the airport capacity expansion options in regard to their competitive outcomes, connectivity and overall user benefits. More specifically, the study answers the following questions:

1. Which factors affect decisions and behaviour of passengers and airlines in the UK airport system?
2. How are airlines likely to respond as a result of adding additional capacity to either Gatwick or Heathrow?
3. What is the “competitive outcome” of the airline responses in terms of connectivity and competition to the benefit of aviation users?
4. How likely are the airline responses in various future scenarios?

The Terms of Reference for this study indicated that the analysis of impacts should relate to the following market segments:

2 At the time of writing of this report, the Commission had made the decision not to shortlist the Estuary option. More information on this decision can be found here: <https://www.gov.uk/government/news/airports-commission-announces-inner-thames-estuary-decision>.

- Airlines - legacy long-haul, low-cost long-haul, legacy short-haul (including domestic), low-cost short-haul (including domestic) and charter;
- Passengers - business, leisure and visiting friends and relatives (VFR); inbound and outbound traffic;
- Freight users - belly hold and dedicated freighters.

The Terms of Reference also indicated that the driving factors identified should build on those set out by the Airports Commission in Chapters 2 and 4 of the Commission's Interim Report (Airports Commission 2013).

The two Heathrow expansion proposals short-listed by the Airports Commission³ have been grouped together as one Heathrow expansion option for the purpose of this work. The alternatives have been grouped together as they are very similar in the context of this study: they share the same location, the same catchment area and provide the same peak-hour capacity. Only the terminal capacity is different, by 40 000 annual aircraft movements (Air Traffic Movements, ATMs).

This study is qualitative in nature and will be published as part of the Commission's national consultation on the three short-listed options in November 2014.

1.2 Our approach

To address the objectives outlined above, we first set the scene by addressing the various airline and passenger market segments used in this study, as well as the traffic and connectivity characteristics of the London airports system. Next, based on review of literature and our expertise in the aviation sector, we identify the main factors that drive airline and passenger behaviour in the different segments. This information allows us to sketch the potential changes in airline (network) behaviour if additional capacity were to be added either at Heathrow or at Gatwick. We then assess the implications of these airline responses for connectivity, competition and reduction of airline scarcity rents. As not all airline responses are likely in every future scenario, we assess the likelihood of the identified airline responses for the different future scenarios defined by the Airports Commission.

The approach chosen in this study is of a qualitative nature, based on the available academic/empirical literature and relevant material submitted to the Airports Commission by the three scheme promoters: Gatwick Airport Ltd, Heathrow Airport Ltd and Heathrow Hub Ltd in May 2014.

This report has been reviewed by four external experts.

1.3 Follow up work

In November 2014, the Airports Commission commissioned a study to quantitatively model the outcomes discussed in this study. The intention is to publish these results in December 2014.

3 The two alternatives are Heathrow Airport Ltd. (HAL) and Heathrow Hub Ltd. (HHL). HAL proposed one new runway to the north west of the existing airport spaced sufficiently to permit a fully independent operation. HHL proposed extension of the existing northern runway to the west to a length of at least 6 000m to allow the extended runway to operate as two independent runways: one for departures and one for arrivals (Airports Commission 2013).

2. Airline business models and segments

Most airlines are focused on maximising profits and return on invested capital. The way they try to achieve this differs considerably depending on their business model. The different airline business models and the potential evolution in these models is important for understanding possible airline responses after expanding capacity at either Gatwick or Heathrow.

2.1 Business models for different airline segments

Before analysing any potential airline responses following expansion of capacity at either Heathrow or Gatwick and the consequences for competitive outcomes, we need to define relevant airline and passenger market segments as the factors that drive behaviour following expansion of capacity differ somewhat from segment to segment. In addition, we need to set out the current status of the London airports in terms of market, connectivity and infrastructure characteristics as our point of departure for further analysis.

Network growth follows profitability

Most airlines are focused on maximising returns on their invested capital. Airline managers have to meet financial targets. Growth of the network is generally only possible when financial targets are met. Proposing growth in the context of sustained corporate losses is generally seen as far too risky a strategy.

The way airlines try to maximize financial returns varies considerably according to marketing tactics and business model. Airline business models differ strongly in their product and organizational architecture (Mason & Morrison 2008), ranging from cost minimizing carriers, such as Ryanair, targeting primarily the most price sensitive passengers, to more yield oriented carriers like British Airways, with a strong focus on premium passengers. This study distinguishes between legacy network carriers, low-cost carriers and charter/ leisure carriers.

Airline business models are evolving

We note that defining airline market segments/ business models is easier said than done as today's airline business models are increasingly blurring. As Mason & Morrison (2008, p.1) put it: "meaningful definitions of and distinctions between airline business models are not easily formulated, particularly when one considers the extremely dynamic nature of the industry".

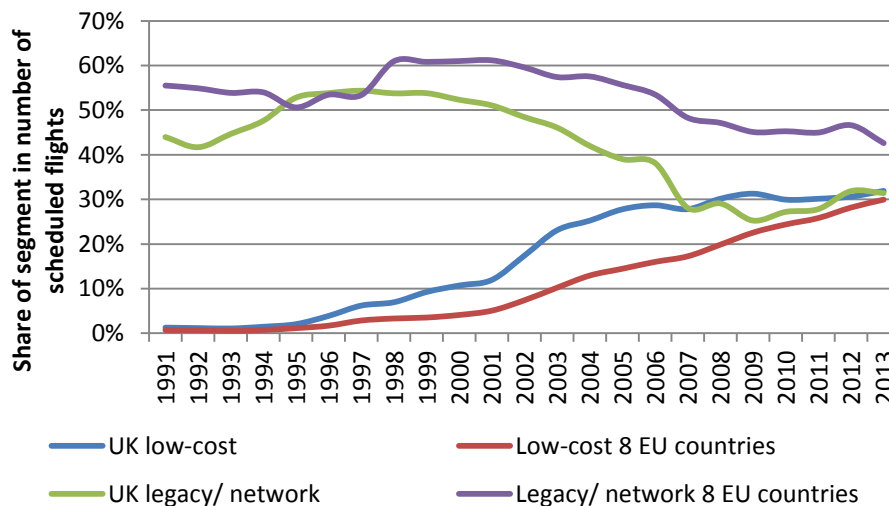
In response to increasing competition, lower yields and changing customer preferences, many so-called network/ legacy carriers have adopted (and are increasingly adopting) elements of low-cost carrier business models, such as single class cabins and unbundling of the product (charging separately for baggage for example). Many passengers traveling with European network carriers have to pay separately for checking-in luggage and reserve their preferred seat. In response to market saturation, or in order to benefit from serving specific market niches, many low-cost and leisure carriers have begun adopt to a smaller or larger extent characteristics of the network/ legacy carriers, ranging from assigned seating to the marketing of connecting flights and codeshare agreements (Klophaus et al. 2012; Mason & Morrison

2008). This should be kept in mind when assessing potential airline responses following expansion of Gatwick or Heathrow, in particular when considering longer-term impacts.

2.2 Legacy/ network carriers: the home-based hub carrier

The share of the legacy/ network carriers has been declining since low-cost carrier growth took off at the beginning of the century, and a few years prior to this in the UK. Yet, their share of intra-European traffic is still substantial, as the figure below illustrates. For long-haul destinations, legacy/network carriers are much more important, as their hub operations enable them to serve long-haul destinations that are not profitable with origin-destination traffic alone. The share of low-cost/charter carriers in this market is still low, but that may change should new low-cost business models successfully evolve.

Figure 2.1. Legacy/ network carriers still important in intra-EU flights despite growth of low-cost segment⁴



Source: OAG

Hubs allow network carriers to combine local and transfer demand to create route density.

Network carriers combine different origin-destination flows on a single route using their hubs as consolidation points, which facilitate efficient transfers between different flights. Hubs are ‘factories’ to create route density. In general, hubs add value for an airline through beyond-market access and the ability to fill planes and achieve a break-even load factor by carrying transfer traffic as well as origin-destination (OD) traffic. Hence, by supplementing local demand with transfer traffic, the hub operations of network carriers allow airports to grow their network of frequently served destinations far beyond what the local OD-market would be able to support (Airports Commission 2013b).

Hub operations also generate ‘hub premiums’ in the local market for the hub carrier (Button 2002; Gillen & Morrison 2005). The hub premium may reflect the ability to charge higher prices for passengers that are willing to pay for flexible departure times as hubbing permits more frequent departures on the

⁴ Legacy/ network carriers have been defined as the (former) flag carriers of each EU country. For aggregate shares for 8 EU countries, the number of intra-EU flights departing from the UK, Ireland, Spain, Germany, Italy, Belgium, the Netherlands and France has been used.

routes served. In addition, hub premiums may reflect the higher cost of running a busy airport or the scarcity rents at capacity constrained airports.

By differentiating their service levels and using the differences in willingness to pay/ time sensitivity, network carriers are able to achieve a mix of business and leisure travellers on their flights. As a rule of the thumb, network/legacy carriers carry 30% business passengers, which generate 60% of their revenues. This means that leisure traffic still constitutes a considerable part of their revenues and traffic and is essential to make their operations profitable. The same holds true for belly-hold freight traffic to some extent: on long-haul flights, belly-hold cargo can make the difference between a profitable and a non-profitable operation.

Hubs provide local consumers with a much wider set of directly and frequently served destinations than would be possible based on local origin-destination demand alone. As such, hubs allow metropolitan regions to enhance the accessibility of the region and lower time costs for local consumers. This is in particular important for time-sensitive business passengers.

Hence, hubs are not goals in themselves but a means to optimize society's global accessibility. Hence, the key question is whether one large hub operation at Heathrow facilitated by expansion of Heathrow would deliver more economic gains to UK society in terms of better connectivity and more competition than developments following an expansion of Gatwick, taking into account future changes in the aviation market.

Local traffic is more defensible than transfer traffic and the hub carrier in London has a unique position.

Local OD traffic is much more commercially defensible than connecting traffic using the hub, as connecting traffic can often be served via a number of competing airline hub networks. In contrast, the local passenger has fewer alternatives and thus is likely to have a higher willingness to pay for services departing the airport⁵. In this respect, London's hub carrier, British Airways, is in the unique position of operating out the largest OD market in the world. This reduces its need to attract price sensitive transfer passenger to fill its planes and allows it to operate at very high frequencies to its largest markets, especially New York.

Peak-hour capacity is important for competitive position of hubs.

Among the many variables that influence the competitive position of hubs⁶, a highly reliable peak hour capacity is among the most important factors. By the nature of their operating model, network carriers have to concentrate their flights and operations as much as possible in time and space by means of a wave-system structure at a single hub airport. Such a wave-system structure ideally entails an airline schedule that connects all incoming flights at the hub to all outgoing flights within a reasonable time window (Airports Commission 2013b; Bootsma 1997). This requires a high throughput capacity per hour. At major European hub airports such as Frankfurt, Paris Charles de Gaulle and Amsterdam, the respective hub carriers can use more than three runways at the same time, which delivers peak hour capacities of over 120 movements per hour.

5 In its demand model, the Airports Commission considered different price elasticities for OD versus transfer passengers. In addition, Amsterdam, Frankfurt, Paris CDG and Dubai have been included as competing hubs.

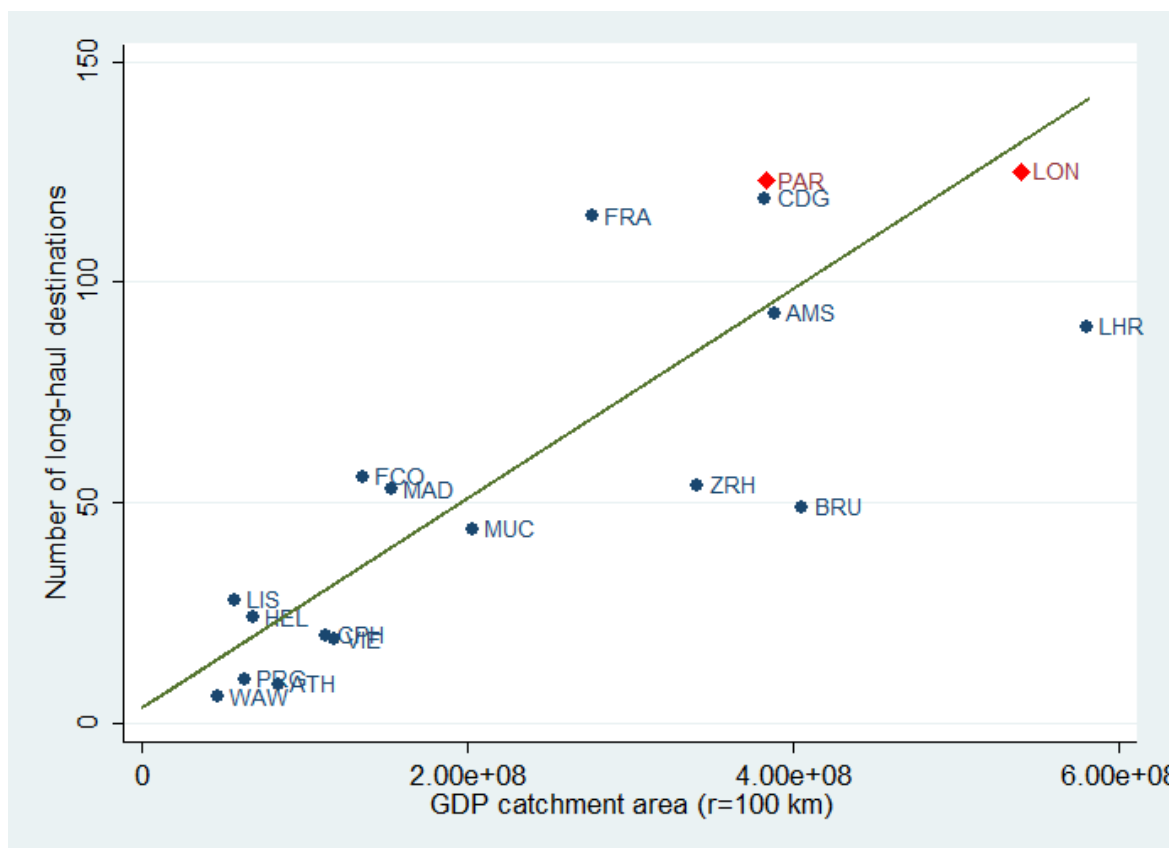
6 Size and strength of the local market, geographical location, minimum connecting time, peak-hour capacity, reliability of peak-hour capacity, bilateral traffic rights, strength of the home carrier(s)

A strong local market supports connectivity

With 88 movements an hour at Heathrow and a relatively limited slot share in the total number of slots compared to hub carriers at other European hub airports⁷, British Airways is not able to operate a fully-fledged wave-system structure at Heathrow. As a result, the hub performance of Heathrow in terms of connections is poorer than that of most airports of similar catchment area size (Figure 2.2). The still impressive network (both long-haul and short-haul) is mainly supported by Heathrow's large and strong local OD market.

This is not to say that the London airports system as a whole has a low connectivity performance. Taking the direct long-haul flights of all London airports together, London is still the best directly connected metropolitan area in Europe. Many lower yield flights tend to 'spill-over' to the other London airports. Yet, relative to its catchment area, London's long-haul network is only slightly smaller than expected when compared to other large metropolitan areas with an airline hub.

Figure 2.2. **Paris enjoys a similar number of long-haul connections to London despite a smaller catchment area: number of unique long-haul connections versus the size of the local market within 100 km range for hub airports in Europe.**



Note: Horizontal axis: gross domestic product produced in a radius of 100 km of the airport or city centre.

Source: OAG; SEO catchment area database; long-haul destinations: destinations >3450km

⁷ 52% in the total number of scheduled flights in 2013 as reported by OAG.

Home-based hub carrier dominant at most hub airports.

The network is only able to benefit from a high peak-hour capacity at the hub airport when it holds the majority of the slots in the peaks. At most of the major hub airports around the world, the hub carrier dominates the hub airports in terms of slot share.

British Airways dominates Heathrow's hub function⁸, but to a lesser extent than legacy carriers at competing hubs elsewhere in Europe. The relatively low slot share of British Airways should be seen in an historical context. In the bilateral era (before liberalization of the intra-EU market), the UK government usually designated multiple carriers in the bilateral air service agreements. This means that British Airways was left with 35% of the capacity on the routes covered by the bilateral and 15% was taken up by other UK carriers, in contrast to the flag carriers of other UK countries that generally held 50% of the international capacity. In addition, BA's UK domestic network is smaller than that of the flag carriers in for example France and Germany. The flag carriers of those countries could top up their 50% share of capacity at the national airport under bilateral agreements with a significant amount of domestic traffic. Finally, foreign carriers have always exercised the great majority of traffic rights to London allocated in bilateral agreements because of the strength of the London market. In other European countries, this was not always the case, leading to a more dominant position of the flag carriers of those countries in their home airports.

The only way to expand the hub operations at Heathrow is by buying slots from other airlines, as far as they are willing to sell them, or by taking-over other airlines (e.g. bmi).

Hub-and-spoke operations incentivise network carriers to concentrate the network on a single location.

The nature of hub-and-spoke networks gives airlines a strong incentive to concentrate the network at a single location: the number of connected city pairs via the hub (and thus the potential to generate connecting traffic) rises exponentially as more flights are added to the network. In other words, one large hub delivers more connections via the hub and more potential to attract transfer traffic than two hubs half the size.

However, a clear advantage in the O&D market, capacity constraints or limits imposed by bilateral air service agreements (more broadly the 'aero-political environment') may warrant deviation from the single hub solution (Burghouwt 2014)⁹. Deviating from the single hub solution means a loss of connectivity and thus reduction in the network economies associated with the hub-and-spoke system¹⁰. Hub carrier British Airways operates about 10% of its flights as stand-alone operations and these are out of Gatwick, supported by the large local (leisure) demand base.

Home-based hub carrier 'capture'.

The business model of the legacy network carrier makes it relatively captive to its home base airport. The connectivity between flights necessary for achieving route density, sunk costs, aero-political constraints and the lack of large-scale airport capacity elsewhere in Europe ties the hub carriers to their

8 About 50% of the passengers of British Airways and its partners within the Oneworld-alliance are transfer passengers (Airports Commission 2013b, p. 50).

9 'Points' and output restrictions defined in bilateral air service agreements may limit a hub carrier in its operations to certain destinations, whereas opportunities may exist from a secondary hub.

10 We will come back to the single hub and multihub discussion when discussing airline driving factors in Chapter 4.

hubs. Switching hub operations between airports is unlikely, in particular with regards to long-haul flights. Dependency on a single hub airport is somewhat smaller for short-haul flights, given the larger local traffic volumes and absence of aero-political constraints for domestic and European traffic, which makes it more feasible to operate stand-alone short-haul, point-to-point flights out of alternative airports.

Network carrier business model under pressure.

European legacy network carriers face difficult times. Since liberalization of the European market, network carriers have experienced a rise in (low-cost) competition with their short-haul feeder networks (Burghouwt et al. 2014). Since the early 2000s, also competition on long-haul flights has been growing. As a consequence, fares and revenues have declined substantially since the 1990s.

In the short-haul market, low-cost carriers have not only generated new demand but have also cannibalized network carriers' market shares and brought down fare levels. However, short haul feeder routes are more or less indispensable for network carriers, because they contribute to the volume needed to support their profitable intercontinental network. Hence, European legacy network carriers search for ways to reduce the costs of their short-haul network, by reducing frills and labour costs, but also by using low-cost (subsidiary) carriers to operate part of their short-haul feeder network. Iberia Express and Transavia are examples of the feeder role low-cost subsidiaries play for Iberia and KLM respectively. Yet, reduction of costs by setting up low-cost subsidiaries is not easy to realize, as the many failed attempts of networks carriers have shown (e.g. Go, Buzz, Snowflake).

In the long-haul market, a new generation network carriers from the Middle East and Turkey has gained considerable market share at the expense of the European legacy network carriers (Copenhagen Economics 2012; Grosche & Klophaus 2013).

London's connecting market is heavily contested.

In the transfer market at Heathrow, competition is fierce: on 85% of routes offered between city pairs with a transfer at Heathrow, hub carrier British Airways and partners face competition from at least one other hub. This is because capacity constraints force the airline to focus on the largest markets, markets in which most other hub carriers also provide connections. This number of contested connecting markets is among the highest of all European hubs and contrasts sharply with Paris CDG (72%), Amsterdam (71%), Madrid (65%) and Helsinki (50%). The heavy competition in the connecting market is counterbalanced by a very large local OD market.

Will new aircraft technology undermine the hub-and-spoke network model?

It is frequently argued that the introduction of a new generation of aircraft (Boeing 787 and Airbus A350) may further undermine the position of the European network carrier. These efficient long-haul aircraft with their lower operating costs will allow competing carriers (either point-to-point or network) to bypass the European hub airports, as more OD-markets can be served directly.

Although a certain level of hub-bypassing may indeed take place, the actual impact of new aircraft technology will be much more nuanced. First, the number of OD-markets that can be served with a direct service will remain limited, compared to the vast number of markets with little OD-demand that need via-the-hub services to be connected. Secondly, the European hub carriers will also be able to use new aircraft technology in order to serve more secondary destinations in a profitable way. In other words, new aircraft technology is likely to result in both a reinforcement of hub systems as well as more hub-bypassing.

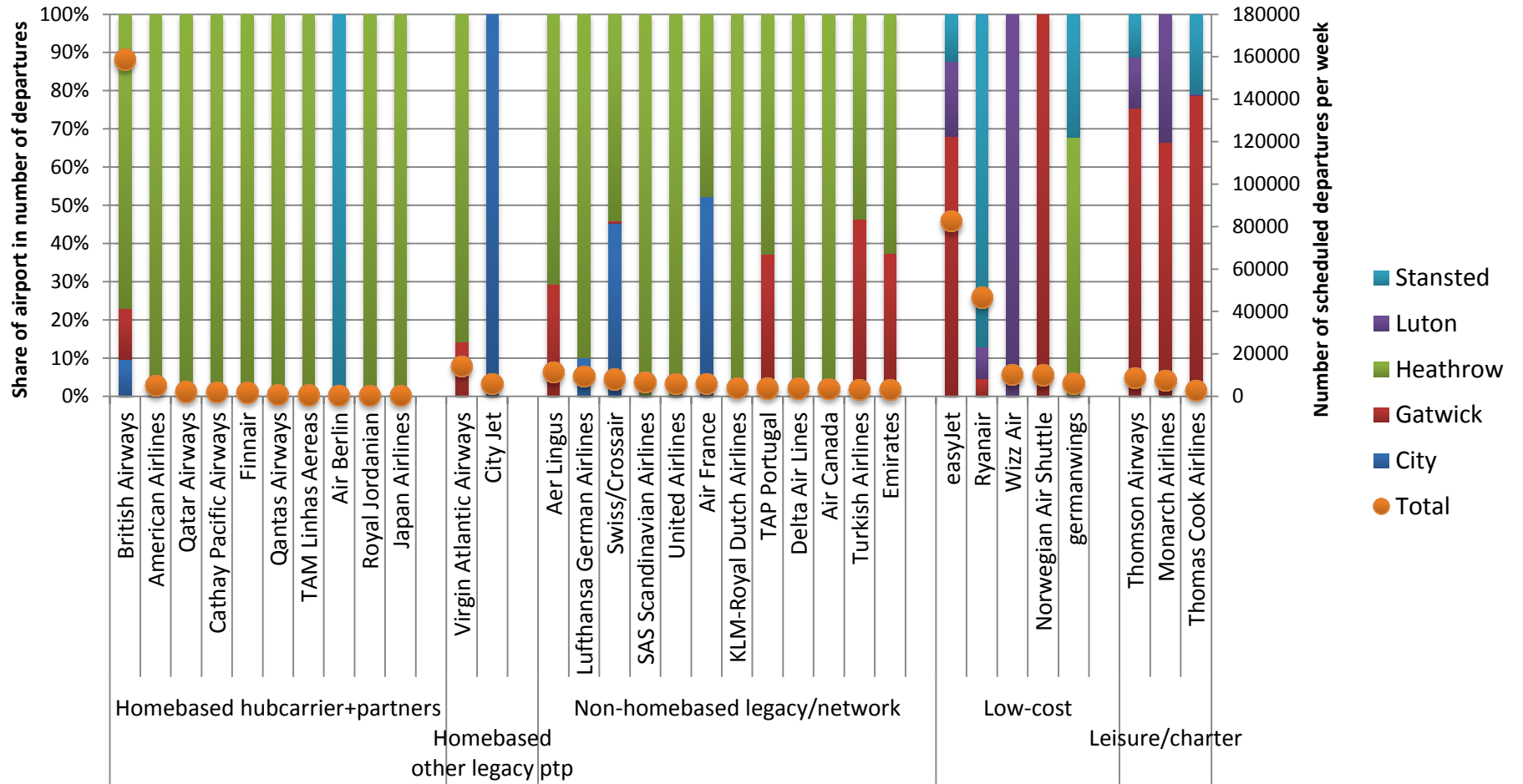
2.3 Other legacy/ network carriers

Hub carrier partners within the Oneworld alliance.

Hub carrier partners within the Oneworld alliance (such as American Airlines, Iberia, Finnair) operate the network model as described in the previous section. However, they operate out of their own, non-UK home base. Nevertheless, they will try to concentrate their networks at Heathrow in order to maximize connectivity with flights operated by other Oneworld airlines to achieve route density advantages themselves. Apart from certain short-haul flights, which have sufficient OD demand for stand-alone service, to Gatwick and City airports for example, Oneworld airlines will aim to concentrate network growth at Heathrow.

Figure 2.3 shows that the Oneworld alliance partners indeed operate the majority of their flights out of Heathrow, with hybrid low-cost/ leisure carrier Air Berlin as the main exception.

Figure 2.3 % distribution of flights of selected carriers by airline segment at the different London airports



Source: OAG

Home-based legacy carriers (outbound).

In London Virgin Atlantic operates flights from both Gatwick and Heathrow. It primarily carries local traffic from and to London. According to the Airports Commission (2013b), the share of connecting traffic of Virgin Atlantic at Heathrow is 20%, with 80% being local OD traffic. Virgin's unit cost and yield levels are both higher than for low-cost carriers.

Non-home based legacy/ network carriers (inbound).

Many network carriers (allied/ non-allied) serving London operate a hub elsewhere in the world and serve the London market as an 'outstation'. They follow the network model to a larger or smaller extent as described in the previous section. For non-EU carriers, a main constraint to their potential expansion in the UK market, apart from any capacity issues, may be the availability of traffic rights to serve the London airports.

Legacy network carriers are mainly attracted to London by the size and strength (yield) of the local OD market, which Gatwick and Heathrow are both well suited to serve. City is very well placed for short-haul business flights, given its inner city location (Table 3.2). The high-yield profile of Heathrow is another reason that most of the other legacy/ network carriers operate out of Heathrow, at least as far as long-haul traffic is concerned.

Nevertheless, a number of legacy network carriers operate out of Gatwick, including Emirates, Turkish Airlines and Vietnam Airlines. The main reasons are (1) the fact that Heathrow capacity shortages prevent them from starting operations or growing their operations further and (2) the availability of a large catchment area for leisure traffic (3) substantially lower airport charges and (4) in some cases constraints in bilateral air service agreements. Future growth in inbound leisure demand as a result of the quickly growing middle class in Asia may increase the attractiveness of Gatwick for inbound network carriers from Asia.

The characteristics of Stansted and Luton do not meet the user requirements of most of legacy/ network carriers, although Stansted does have the facilities to serve legacy carriers. The longer landside access times would require them to accept much lower fares and achieve a much lower cost base, comparable to the point-to-point low-cost carriers. In addition, the longer access times from London city centre make Stansted and Luton less attractive for business passengers¹¹. In addition, runway length at Luton currently does not allow for long-haul operations with wide-body aircraft.

2.4 Low-cost carriers

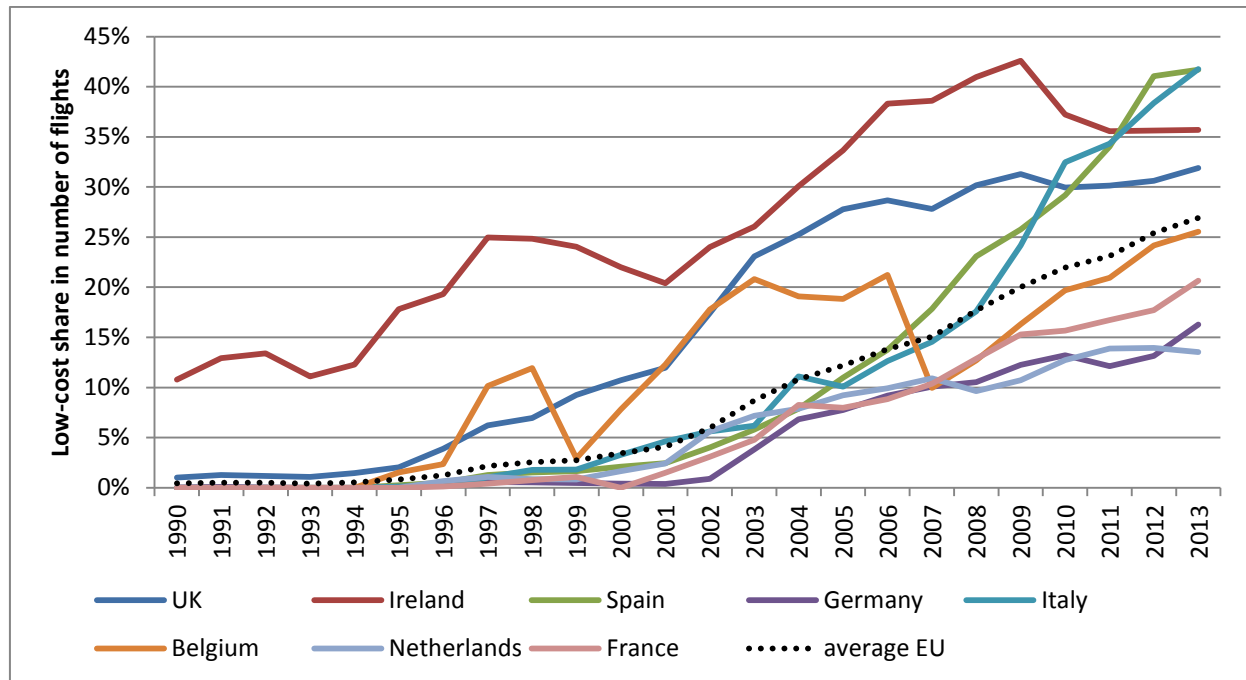
The importance of low-cost carriers for the UK market.

The role of the low-cost segment for providing connectivity in the London airports system and in the UK as a whole should not be underestimated. In Europe, the low-cost model was pioneered by Ryanair in Ireland and the UK in the 1990s. During these years, the low-cost business model did not have any significant market share in Europe apart from the UK and Ireland. A small group of low-cost carriers now account for over 30% of the short-haul scheduled market from and to the UK within

11 This is not to say that low-cost, point-to-point carriers as such are not attractive to business passengers: a growing share of business passengers use low-cost carriers on short-haul trips as they value the core proposition of low-cost carriers once they are familiar with the product (high value-price ratio and reliability).

Europe. This is above the EU average and substantially more than the share in a number of other EU countries including Germany, the Netherlands and France (Figure 2.4). Within the UK, 37% of the seat capacity was provided by low-cost carriers in 2012 (Dobruszkes 2013). Not only is the UK's low-cost connectivity increasingly relevant for leisure trips and passengers visiting family and relatives, but also to business passengers.

Figure 2.4 **Share of low-cost flights in total number of flights is particularly high in the UK, Ireland, Spain and Italy**



Source: OAG; SEO analysis; Note: intra-EU flights¹²

Low-cost carrier growth has had different effects on the welfare of UK consumers. Low-fares have stimulated the market and created a group of travellers that would otherwise not have travelled by air. Low-cost carriers have brought down fares for existing travellers. It is generally acknowledged that the presence of a low-cost carrier is one of the most important determinants of fare levels. Furthermore, low-cost carriers have established numerous new services to new, short-haul destinations from the UK airports. Finally, since low-cost carriers tend to be more footloose and dynamic, they have stimulated competition between airports in the UK in the market for airline services.

Short-haul low-cost carriers.

Although there is no single low-cost carrier model (Klophaus 2012; Mason & Morrison 2008), low-cost carriers generally focus on short-haul, point-to-point destinations and strive for profit maximization on each route. If the flight is not profitable, they exchange the route or even give up the airport, for a

12 For the purpose of a consistent comparison over the years, the EU area covers “EU15+2”: Belgium, Germany, Denmark, Finland, France, Greece, Ireland, Italy, Luxemburg, Netherlands, Austria, Portugal, Spain, United Kingdom Sweden+ Norway and Switzerland. A conservative selection of low-cost carriers has been used, of which EasyJet, Ryanair, Vueling and Norwegian are the most important. A wider selection of low-cost carriers will result in larger low-cost shares.

more profitable one. This makes them much more footloose and independent of any airport than network carriers, which have to consider the impact of each route on their overall network profitability. In addition, the focus on intra-European operations (and consequent lack of aero-political constraints)¹³ as well as lower sunk costs further contributes to their freedom to reconfigure operations. Annual route churn and the seasonality of the connections offered are considerably higher than those of the legacy/network carriers.

Being able to operate at lowest cost relative to its competitors is crucial for the success of a low-cost carrier. To win market share and create new markets their major tool is to offer lower fares on these routes than competitors. Both the use of underserved, secondary airports as well as low fares enables the carriers to create new markets, generate new market demand (market stimulation), expand the catchment area by exchanging longer access times for lower fares (catchment area expansion) and gain market share from incumbent carriers (cannibalization). Keeping fares low, means competing at the lowest cost possible. Especially on short haul routes the cost per seat/mile of a point-to-point carrier can be 30-50% lower than the operating cost of a legacy carrier at the same route.

Operations and services are completely dedicated to reaching the lowest cost possible on every link of the operating process. This means high productivity by efficient use of airplanes and fast aircraft turnarounds, operating from uncongested secondary airports with lower landing fees, and lower cost of staff with less services on the ground (no busses, no bridges) and in the aircraft. For additional services passengers have to pay (unbundling).

Low-cost airlines mainly focus on leisure passenger markets, which are more price-sensitive and accept longer access and egress times in return for lower fares. By focusing on trips from London to European cities with very low fares, they created new and fast growing markets.

Long-haul low-cost airlines.

The low-cost business model is especially competitive on short-haul flights. Here, the efficiency gains through maximising aircraft utilization and cost advantages of operating out of secondary airports are highest. On long-haul routes low-cost carriers have to compete with already long established network carriers. The conventional view is that this is far more difficult than on short-haul routes because the efficiency gains that can be achieved are much smaller. Aircraft on long-haul routes already up to operate 20 hours a day. Furthermore, the possibilities for reducing frills (seat pitch, catering, entertainment, etc.) and labour costs on long-haul flights are more limited (Francis et al. 2007; Morrell 2008; Wensveen and Leick 2009). Cross-subsidization of economy fares with the premium fares becomes impossible in a single class cabin. Finally, the infrastructure of many secondary airports that host low-cost flights is not suitable for long-haul flights. The main opportunity for long-haul low-cost operations lies in lower labour costs and the use of a new generation, fuel efficient aircraft (Boeing 787 and Airbus A350).

The common opinion among experts is that the long-haul low-cost network will be initially restricted to destinations with sufficient volume to set up direct flights. This is supported by the long-haul low-cost operations of Norwegian Air Shuttle and AirAsia X. The notion that low-cost operations will be limited to ‘thick’ long-haul markets is rooted in the fact that setting up a short-haul network to feed the long-haul flights is generally considered to result in too much complexity and raise unit costs too high for low-cost carriers. If long-haul low-cost carriers are to acquire a significant share of the long-haul market, they will need to feed the long-haul routes with short-haul feeder services, but without jeopardizing

13 This holds true for the majority of the low-cost operations in Europe, although a small share of them is being operated to destinations outside the common aviation market (e.g. EasyJet to Moscow and Turkey).

aircraft utilization rates or creating network complexity. Norwegian Air Shuttle is trying to develop such a model through its Oslo, Stockholm, Copenhagen and Gatwick bases, while AirAsia X operates a similar model out of Kuala Lumpur.

New aircraft technologies, now being introduced in the Boeing 787 and Airbus A350, make it possible to serve less dense long-haul routes on a profitable basis. These new aircraft are likely to increase the opportunities for the long-haul low-cost business model.

Low-cost operations in the London airports system.

In the London airports system, low-cost service is concentrated at Gatwick, Luton, Stansted and Southend. Gatwick is more expensive to operate from, but fits into the business model of low-cost carriers searching for markets that are able to deliver higher yields; carriers such as EasyJet or Norwegian Air Shuttle. As such, Gatwick is more comparable in terms of low-cost traffic profile to airports such as Orly and Amsterdam than it is to Stansted and Luton. Stansted and Luton are more attractive for ultra-low-cost carriers such as Ryanair and Wizzair¹⁴.

The changing low-cost carrier business model

In the past two decades low-cost carriers realised double-digit growth figures, but this market appears to be nearing saturation, in particular in the UK (De Wit & Zuidberg 2012; Burghouwt et al. 2014). Growth levels are beginning to reflect generic market growth more and more closely and the potential for new market generation is diminishing. For this reason low-cost carriers have to look for new markets. They increasingly fly longer routes, fly more low frequency routes and fly more routes to the primary European airports, which gives them access to premium demand. Like the business models of network carriers, the low-cost business model is becoming increasingly hybrid. Vueling offers connecting flights through its home base, Barcelona, but without operating a complex wave-system structure for arrivals and departures. Connecting traffic is not a primary objective for the carrier but a useful addition. In their pursuit of business travellers and higher yields, EasyJet operates from bigger hub airports with higher premium markets. Even Ryanair is increasingly entering primary airports and targeting the business passenger¹⁵. This may put low-cost carriers potentially in a position to feed hub-carrier long-haul flights.

Low-cost feeding the hub carrier's long-haul flights?

It is not unthinkable that low-cost carriers will increasingly take over the short-haul flights of network carriers in the future, a development that may already have started as network carriers are setting up low-cost subsidiaries to take over part of their short-haul operations (Transavia for Air France-KLM, Germanwings for Lufthansa, Iberia Express and Vueling for Iberia). Yet, there is essentially a limit to the extent to which this is possible and likely: hub scheduling and baggage transfers involve costs that undermine the core competitive advantage of low-cost carriers: a simple and cost efficient operation.

14 Few low-cost airlines operate into Heathrow. Exceptions are Vueling and Germanwings. Lufthansa's low-cost subsidiary Germanwings operates into Heathrow, after it took over the short-haul services from Lufthansa not starting or finishing in Frankfurt or Munich.

15 Ryanair announced its BusinessPlus programme in September 2014.

2.5 Leisure carriers

Full leisure carriers – also known as charter airlines – focus on point-to-point traffic, mostly as non-scheduled flights that are part of package tours. Until recently they operated mainly in the business-to-business (charter) market in which the distribution of seats is dominated by tour operators. Some of the large tour operators run their own airlines (Thomson/ TUI, Thomas Cook/ Condor).

Since the liberalization of the EU market at the end of the 1980s, the leisure/ charter business model has become more hybrid. New distribution models and changing consumer preferences have altered the market. Helped by the Internet revolution and a growing low-cost offer to holiday destinations, individual travellers increasingly arrange their holiday accommodation and travel separately. Low-cost carriers have gained market share in particular on the Mediterranean leisure market. In response, the large leisure airlines nowadays also sell seat only tickets, while others have converted (e.g. Transavia) themselves into low-cost operators. Some charter airlines have been taken over by network carriers and compete with low-cost carriers at European feeder destinations (such as Transavia for KLM). In such cases, their operations are closely connected with the operation of the network carrier at its hub. The remaining leisure/charter airlines have strongly consolidated over the years, with TUI Travel and Thomas Cook with their respective airline brands being the main conglomerates.

Because their margins on tickets are very small, most leisure/charter carriers are very sensitive to airport charges. In the London airport system, leisure/charter traffic is mainly concentrated at Gatwick and to a lesser extent at Luton and Stansted. Due to runway requirements, long-haul leisure traffic cannot use Luton, whereas Heathrow is too expensive.

2.6 Cargo operators

Cargo operators are active in three main markets: belly cargo, full freighter (maindeck) and integrator/ express markets. The focus for air cargo carriers is on high value, light and/ or perishable goods such as electronics, fast fashion, flowers and pharmaceuticals. Globally, roughly half of all cargo volume is carried on scheduled flights in the belly of wide body aircraft. Scheduled and non-scheduled full freighter operators and integrators that operate in the 24 hour express parcel market transport the other half of the total air cargo volume.

Belly cargo on intercontinental routes accounts for 10-15% of the total revenues of the average flight, which may be decisive for route profitability. This cargo segment is concentrated at hub airports with scheduled intercontinental connections. Although Heathrow does not have room for full freighters and has formal restrictions on full freighter operations, it is still one of the biggest cargo hubs in Europe because of the belly freight transported. As belly cargo requires the availability of scheduled long-haul, wide body capacity, within the London airports system cargo traffic is concentrated at Heathrow.

Elsewhere in the UK, East Midlands is an important marketplace for cargo. A competitive cargo marketplace means a strong regional cargo market, presence of global forwarders, high quality handlers and choice of handlers, road feeder services, availability of night capacity and attractive visit costs. Congestion costs and slot values, the small margins on full freighter services as well as the applicable traffic distribution rules have resulted in absence of full freighter flights at both Heathrow and Gatwick.

On a European scale, most cargo operators are highly footloose and freight is trucked over long distances to airports. Full freighter operators mostly concentrate at hub airports or dedicated cargo airports with a competitive cargo marketplace.

Integrators such as FedEx, UPS, Danzas and TNT mostly operate in the parcel market and take care of the total door-to-door chain. They run their own planes and prefer airports with sufficient (night) and peak capacity for their hub operations. They do not need a competitive handling market and presence of forwarders, as they run their own facilities as stand-alone operations. Because of globalization and online shopping, it is expected that the share of integrators will increase in the future. Currently, the London airports have no room integrators hubs due to the lack of peak hour and night capacity (although some integrator flights operate into the London airports).

3. The London airports system

The London aviation market is the largest in the world in terms of passenger numbers. It is segmented over a constellation of different airports. Each shows a clear specialization in terms of airlines and passengers market segments served. This reflects capacity constraints, geographical location and infrastructure characteristics and has evolved over time as the privatized airports develop in a market oriented regulatory framework.

3.1 The London market

London is the largest OD market in the world.

The London market is the biggest and strongest aviation market in global air transport in terms of local passenger numbers. In 2013 the total London OD market reached 110 million OD passengers per year,¹⁶ served by six different airports.

The London airport system consists of Heathrow (LHR), Gatwick (LGW), Stansted (STN), Luton (LTN), City (LCY) and Southend (SEN). Although the number of aircraft movements has remained stable over the last ten years, passenger numbers have grown by 1.5% per annum, mainly due to increase in aircraft's size (Table 3.1)¹⁷.

Table 3.1. **Key features of the London airports (2013)**

	Heathrow	Gatwick	Stansted	Luton	City	Southend	Total
Volume							
Passenger movements (mln)							
<i>Absolute</i>	72.3	35.4	17.8	9.7	3.4	1.0	139.7
<i>Annual growth ('03-'13)</i>	1.4%	1.7%	-0.5%	3.6%	8.7%		1.5%
<i>Transfer share</i>	37%	7%	4%	2%	2%	NA	
<i>Business share</i>	30%	15%	15%	16%	54%	NA	
Freight and mail (x1,000 ton)							
<i>Absolute</i>	1,515	101	237	29	0	1	1,882
<i>Annual growth ('03-'12)</i>	1.5%	-8.0%	1.6%	2.4%	-		0.7%
Capacity							
Aircraft movements (x1,000)							
<i>Absolute</i>	472	251	146	96	74	29	1,068
<i>Annual growth ('03-'13)</i>	0.2%	0.3%	-2.4%	1.2%	3.4%		-0.1%
Scheduled seat capacity (mln)*							
<i>Absolute</i>	92.0	41.1	21.7	11.8	5.3	1.3	173.1
<i>Annual growth ('03-'13)</i>	0.6%	4.2%	-1.4%	4.2%	6.4%		1.5%
<i>LCC share</i>	1%	64%	99%	99%	1%	92%	
<i>Average delay (mins)</i>	13.6	13.9	9.5	10.8	6.9	NA	

* Excludes non-scheduled flights

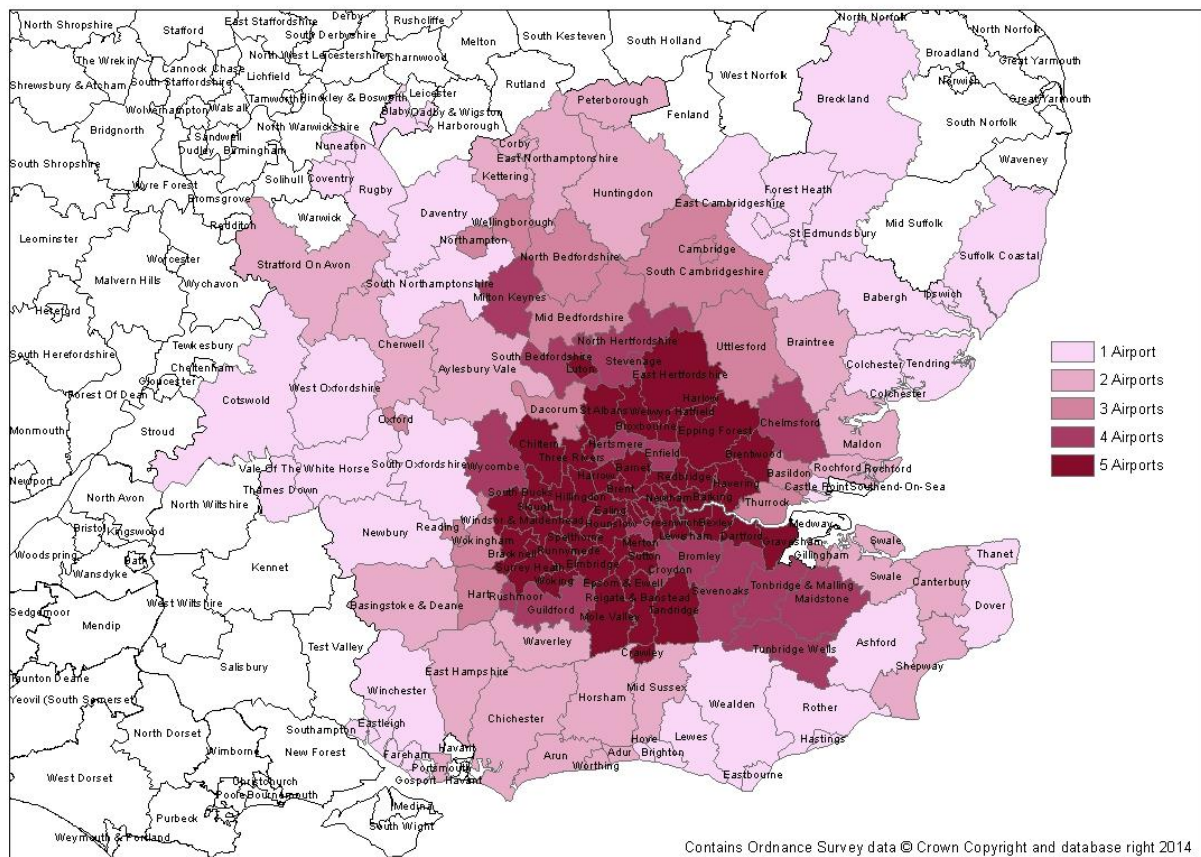
Sources: CAA, OAG

¹⁶ See Airports Commission (2013), p.59.

¹⁷ Southampton may serve some traffic from the edge of the London metropolitan area but is not considered as a London airport here.

The local population is characterized by a very high propensity to fly. The catchment area of the London airports significantly overlaps when looking solely at access times to the airports (Figure 3.1). The overlaps are especially pronounced for the Greater London districts, which are also the most densely populated districts. This means that there is substantial potential for competition between the London airports, although it is likely to be more limited than the isochrones may suggest as each London airport offers a different combination of available destinations. Moreover, different passenger segments (business/leisure; long-haul/short-haul) value access time differently.

Figure 3.1. **Overlap of airport catchment areas with 90 minutes access time**

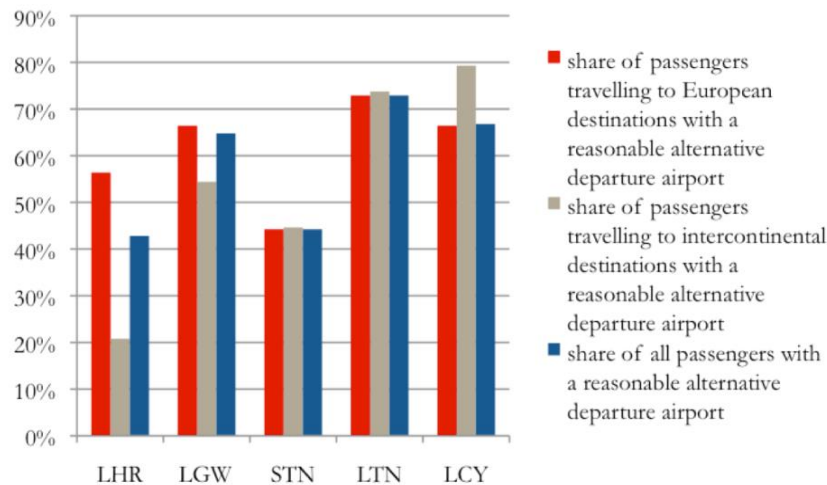


Source: CAA (2011)

Competition for local long-haul passengers is weakest.

Actual competition depends on the extent to which the airports offer services that are a reasonable substitute for passengers. Against this background, (Figure 3.2) shows the estimated share of passengers departing from the London airports that have a reasonable substitute departure airport at their disposal. Generally speaking, it is the passenger at Luton, Gatwick and City that has most reasonable substitutes in terms of destinations offered, whereas at Heathrow and Stansted there are fewer alternatives. At Heathrow and Gatwick, passengers travelling to short-haul destinations have more choice than passengers travelling to long-haul destinations. In particular Heathrow offers a lot of exclusively served long-haul destinations.

Figure 3.2. Estimated share of passengers departing from the London airports with a reasonable alternative departure airport



Source: SEO catchment area model; 2012 data; Note: includes both direct and indirect travel options; shares do not give information about the absolute size of the passenger flows; transfer passengers are excluded

Long-haul traffic is rather concentrated

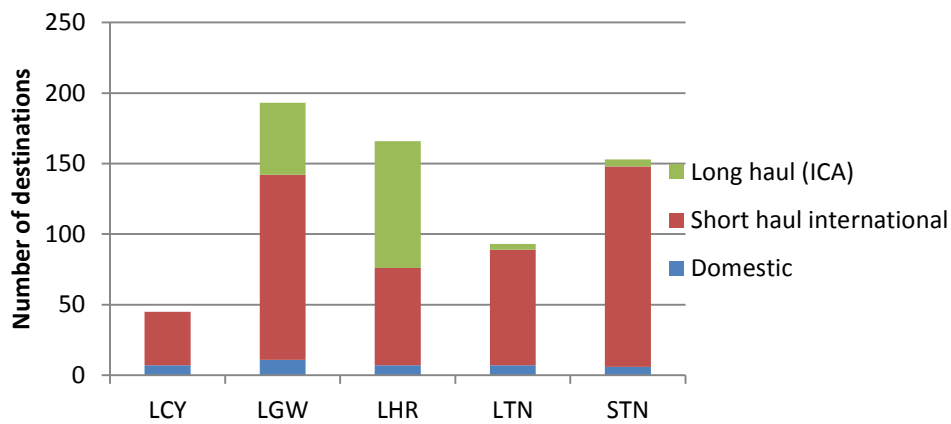
As Table 3.2. shows, the majority of the long-haul network is concentrated at Heathrow with 84% of the scheduled long-haul flights. Heathrow serves over 60% of the scheduled long-haul destinations exclusively in the local OD-market. Gatwick is the second long-haul airport with 14% of the scheduled flights. Yet Gatwick's network scope is relatively large: it served over 50 long-haul destinations in 2013 versus 90 at Heathrow. This reflects an average frequency per destination that is much lower than at Heathrow.

Table 3.2. Shares of aggregated airline market segments at the London airports by number of flights

	Heathrow	Gatwick	City	Stansted	Luton	Total
Long haul	84%	14%	0%	1%	2%	100%
Short haul	39%	29%	9%	15%	9%	100%
Home based hub carrier + alliance partners	79%	12%	9%	0%	0%	100%
Legacy PtP carriers	86%	14%	0%	0%	0%	100%
Other non homebased network carriers	69%	14%	15%	2%	1%	100%
Low-Cost carriers	3%	44%	1%	33%	19%	100%
Leisure/ charter	0%	74%	0%	8%	18%	100%

Source: OAG; note: other non-home-based network carriers are those carriers that do not belong to the Oneworld alliance and operate a hub outside the UK.

Figure 3.3. Gatwick largest airport in terms of scheduled destinations offered

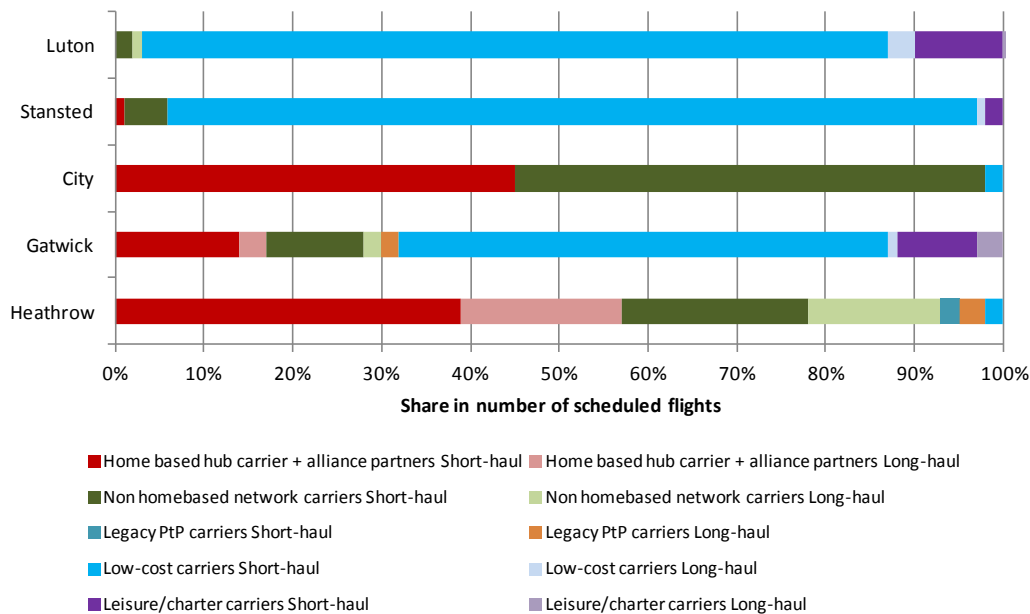


Source: OAG; 3rd week of September 2013TF, 2013.

High-yield traffic is concentrated at Heathrow, lower yield and leisure traffic at Gatwick.

An important difference between the Gatwick and Heathrow market is the fact that the high-yield segment, predominately served by legacy carriers, is concentrated at Heathrow, while the lower yield/leisure segment is more concentrated at Gatwick, mainly served by point-to-point carriers (low-cost and leisure). This is also reflected in the number of business passengers from London’s central business district that use Heathrow. Carriers such as British Airways, Emirates and Vietnam Airlines also serve long-haul destinations from Gatwick, but these flights are operating in a lower yield segment than those at Heathrow. Stansted and Luton serve only 46 long-haul flights a week, nearly exclusively in the point-to-point leisure markets (Caribbean and North Africa). London City airport does not serve long haul traffic, due to runway restrictions, except for an all business class, narrow body service to New York.

Figure 3.4. Share of airline market segments at the London airports in number of scheduled flights (2013)



Source: OAG.

Short-haul dispersed over the different airports

The short-haul market is reasonably distributed over the London airports in terms of the number of flights. In the short-haul market, Heathrow is, with almost 40% of the scheduled flights, far less dominant than in the long-haul segment. With 29% scheduled flight share, Gatwick takes a significant share in this market. The other London airports together take a share of around 33%. However, in the higher yield segment Heathrow and City are the main airports. With over 600 flights a week executed by British Airways and other legacy carriers, Gatwick also takes a significant share in the more premium short haul market. Gatwick dominates the point-to-point low-cost market with 44% of flights and accounts for 74% of scheduled flights in the leisure/ charter segment. The other London airports, Luton and Stansted, which account for 24% of scheduled flights in the short haul market, focus nearly exclusively on the low yield segment served by low cost and leisure/ charter carriers.

3.2 Heathrow

Heathrow operating at full capacity.

Heathrow is by far the largest of the London airports in terms of passenger movements (72.3 million) and the second largest in terms of destinations offered. Aircraft movements only increased by 0.2% per annum over the last decade. Passenger growth was realised with larger aircraft and higher load factors. Heathrow also processes the majority of cargo in the London airport system. All freight and mail is carried in the belly hold of passenger aircraft, no main deck cargo capacity is available at Heathrow.

The airport has been heavily congested for years, which is not only reflected in capacity shortages but also in high average flight delays. The airport's two runways currently operate at around 99% capacity for most of the time. Annual air traffic movements are currently restricted to 480 000. Switching to mixed mode to increase capacity is not allowed. Carriers willing to expand operations at Heathrow therefore must either purchase very expensive slots from other carriers, take over other airlines (e.g. bmi by British Airways) or increase the size of their aircraft even further¹⁸ Due to restricted runway capacity there is an imbalance between airside and landside capacity: passenger movements are therefore well below the terminal capacity of 90 million passengers per annum.

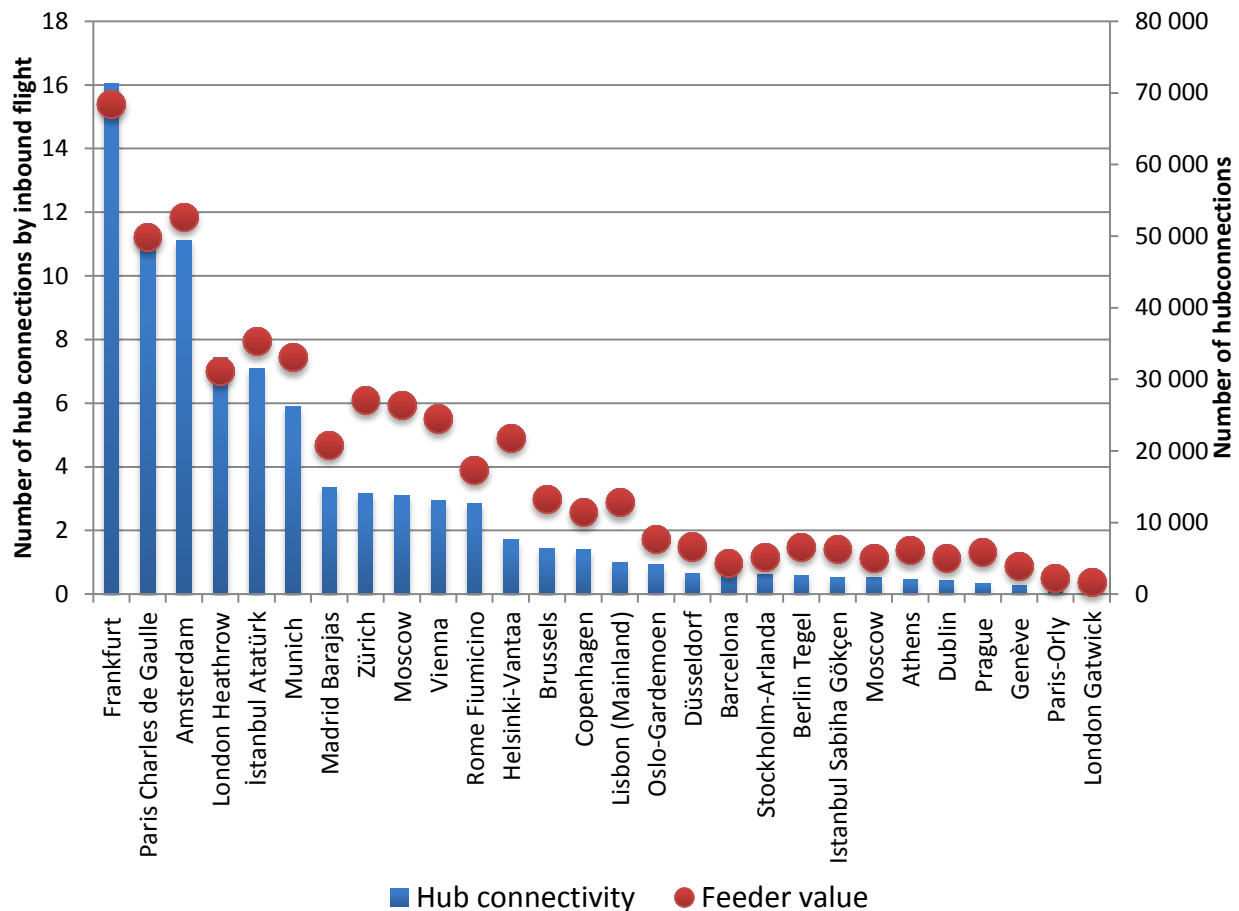
Heathrow is an important transfer point but not a 'classic' hub.

Heathrow is the only hub in the London airports system. It has a 37% transfer share, although it is not a hub in a classic sense. It is the fourth airport in Europe in terms of the number of hub connections offered (Figure 3.5). However, the transfer share is small compared to the other large but less congested hubs in Europe, such as Frankfurt and Amsterdam. In addition, its feeder value¹⁹ is lower than at Frankfurt, Amsterdam, Paris CDG, Munich and Istanbul, which indicates a weaker hub operation. British Airways has the largest hub operation at the airport with many short-haul flights connecting to long-haul intercontinental flights

18 Yet, a number of spare slots is available in the winter season.

19 The number of online, onward connections per arriving flight at the hub.

Figure 3.5. Heathrow ranks fourth in terms of the number of hub connections offered per week



Note: Number of online connections offered via the hub per week, weighted by transfer time and detour time.
Source: ACI Europe & SEO 2014; SEO Netscan.

Peak-hour capacity is lower than at other European hub airports.

As a result of the capacity constraints of the runway system, peak hour capacity is far lower than at the other European main hubs, which limits the operation of a wave system for arrivals and departures that characterizes classic hubs such as Frankfurt and Amsterdam and limits the size of the feeder network. The share of British Airways in total air traffic is also lower than that of home carriers at the other hubs, although it increased considerably in recent years because of slot and airline acquisitions. Consequently, Heathrow lags behind the major European hubs in terms of connectivity provided in the connecting market.

In its Interim Report, the Airports Commission indeed finds that a concentrated airport model (with hub capacity concentrated at one of the London airports) would deliver better connectivity results than spreading hub capacity over two, two-runway airports (Airports Commission 2013, p. 130). Yet, the difference is less marked than it would be for other cities in the world because of the large local market, which also supports high levels of connectivity under a dispersed model.

Strong local market.

Heathrow is in a different position than other hubs as, thanks to the big London market for long-haul traffic and a well-functioning slot market, the number of intercontinental destinations is still high. The secondary slot market at Heathrow has enabled airlines with a high willingness to pay to buy scarce Heathrow slots and use them for long-haul flights. The yields that can be achieved at Heathrow are higher than at other London airports: according to the Airports Commission (2013, p.62), airlines operating out of Heathrow in 2012 earned 21 US cents per passenger mile on average versus 15 and 10 cents at Stansted and Gatwick respectively.

Table 3.3. **Heathrow compared with other European hubs in terms of capacity and connectivity (2013)**

	LHR	FRA	CDG	AMS
Yearly capacity in aircraft mvmts	480.000	700.000	700.000	560.000
Peak hour capacity	85-90	120-125	120-140	110-115
Terminal capacity in annual pax.	90 m.	85 m.	85 m.	65 m.
Long haul destinations (>3750km)	80	101	98	87
Short haul destinations (<3750km)	90	119	116	73
Transfer share	37%	54%	31%	45%
Hub connectivity/week	33.006	71.252	50.188	49.389
Feeder value	6,9	15,4	11,2	11,8

Source: ACI Europe & SEO (2014); OAG; SEO Netscan; individual airport data

Note: feeder value indicates the number of onward hub connections per arriving flight

Expansion could raise capacity up to 700-740 000 movements per year.

A third runway at Heathrow, or extending the northern runway to the west, could raise yearly capacity up to 740 000 (HAL) or 700 000 (HHL) movements²⁰ respectively at a peak hour capacity of 128 movements. That would make Heathrow comparable to the potential capacity of Frankfurt and Paris CDG. A new 6th terminal at a new land extension could raise the potential capacity of the airport to 120 million passengers per annum.

Increase in charges.

Aero charges at Heathrow are expected to rise should the airport be allowed to expand as the project will ultimately be financed by the airlines.

In case of Heathrow expansion, airlines would be less sensitive to a rise of charges than they would be in the case of an equivalent increase at Gatwick because Heathrow is predominantly used by legacy carriers, which are less sensitive to costs than low-cost carriers. The airport handles a relatively large share of business passengers (30%). These passengers are less sensitive to the relatively high airfares at

20 The difference in annual capacity between the two options is due to operational constraints during the early morning and late evening period under the Heathrow HUB option that would have to be introduced to provide local communities with respite.

Heathrow, which are partly the result of the capacity shortage at the airport. And as most long-haul flights are offered from Heathrow, business passengers often have no other choice than to use the airport. Heathrow is less attractive to low-cost and leisure carriers due to congestion, the high slot prices and high airport charges. The same holds true for regional carriers.

At the moment, airlines at Heathrow extract considerable scarcity rents due to excess demand at Heathrow and price-capping of airport charges, charging fares substantially higher than marginal costs.

3.3 Gatwick

Gatwick is the busiest point-to-point airport in Europe.

Gatwick is the second largest UK airport and the busiest point-to-point airport in Europe and used by many legacy network carriers as well as low-cost carriers. It offers more destinations than any of the other London airports and is particularly strong on short-haul routes.

The main carrier by scheduled seat capacity is EasyJet. The airport has a large share of low-cost capacity (64%), which can be explained by the large catchment area for leisure traffic, excellent surface accessibility²¹ including to Central London/ Westminster and availability and price of capacity in relation to Heathrow. In 2013, 85% of its passengers travelled for leisure purposes. Gatwick contributes significantly to the short-haul connectivity (international and domestic) of the London airports system: it accounts for about one third of the short-haul flights in the London airports system. Yields that can be achieved at Gatwick are lower than at Heathrow but airline costs to operate out of Gatwick are substantially lower.

British Airways is the second largest carrier. Its operation at Gatwick is more focused on price-sensitive OD passengers, providing direct competition to EasyJet and other low cost carriers. The carrier also has a significant long-haul operation at the airport, competing with Virgin Atlantic in the long-haul leisure market. With 93% local OD traffic and 7% transfer traffic, the airport mostly serves the OD market, and some interlining passengers²².

Gatwick nearing capacity limits as a single runway airport.

Due to the capacity constraints of a single runway system, flight movements showed hardly any growth over the last decade. Just like at Heathrow, growth in passenger movements was achieved mainly by the operation of larger aircraft.

With a maximum peak hour capacity of around 55 movements an hour, Gatwick has already the most intensively used single runway system in the world. Without a second runway, this number can hardly increase. However, modest future growth in aircraft movements and passengers is expected to be possible using off-peak hours and larger aircraft. Due to noise constraints, extension of operating hours is not a realistic option. By optimizing the taxiways system and the construction of a midfield pier the airport can be developed for 45 million passengers without a second runway compared to 35 million today.

21 2.5 million people within 30 minute travel time (Gatwick Airport Limited 2013).

22 British Airways tried to implement a split hub operation at Heathrow and Gatwick in the second half of the 1990s but abandoned the Gatwick hub in 2001 as it was not profitable.

However, the current hourly capacity of a single runway system is far too small for significant growth of aircraft movements or setting up a hub with a fully-fledged wave system structure. Only investment in a second runway can raise capacity substantially, to around 560 000 movements per year and 98 movements an hour. Such capacity expansion in combination with additional terminal capacity would give the necessary room for significant growth of point-to-point operations at the airport. The growth in peak-hour capacity could potentially be used for some form of hub operation (see chapter 5).

Increase in charges.

Aero charges at Gatwick are expected to rise should the airport be allowed to expand as the project will be ultimately financed by the airlines.

In case of Gatwick expansion, airlines would be more sensitive to a rise of charges than they would be in the case of an equivalent increase at Heathrow as Gatwick has a large share of low-cost airlines, which are more cost-sensitive than legacy carriers. Compared to Heathrow, the airport handles a larger share of leisure passengers. These passengers are highly sensitive to the higher fares that would result if higher aero charges are passed on to the consumer.

3.4 Stansted, Luton and Southend: low-cost, point-to-point leisure services

Stansted

Stansted is the fourth airport in the UK by passenger numbers and is predominantly used by low-cost carriers. After Gatwick, it is the main low-cost airport in the London airports system. The two largest European low cost carriers Ryanair and EasyJet are its main operators. As a result, most of its connections are intra-European. Annual passenger growth at the airport has been negative over the last decade. This was mainly due to Ryanair's decision to decrease capacity at the airport after the airport raised its charges. The airport and Ryanair recently reached a deal in which Ryanair promised to grow its capacity at Stansted in exchange for lower airport charges and better facilities. The same holds true for EasyJet.

Luton

Luton, although around half the size of Stansted, runs a similar low-cost operation. The airport functions as a main operational base of EasyJet, but is also used by other low cost carriers such as Ryanair and Wizzair, resulting in a large share of leisure travellers (84%) and a network which is primarily focused on Europe. The airport also handles a large number of business jets. Aircraft movements increased slightly over the last decade with 1.2% per annum.

Southend

Until the end of the 1970's Southend was the third London airport. Currently it is the smallest of the London airports, handling just under 1 million passengers in 2013. EasyJet started operations at the airport in 2012, which resulted in a large influx of passengers. As a result most scheduled capacity is offered by EasyJet (92%). The airport operator expects passenger numbers to increase to 2 million in 2020.

3.5 City: point-to-point business services

City airport is located close to London's financial district and is therefore the preferred airport for many time-sensitive business travellers, which is reflected by the high share of business travellers using

the airport (54%). The airport primarily operates routes to the rest of the UK and Northern Europe. Due to its short runway, steep glide slope and noise restrictions, it is primarily used by smaller aircraft. Passenger growth has been substantial over the past decade, averaging 8.7% per annum. This growth was realised by both an increase in flight movements and the operation of larger aircraft.

3.6 Future capacity requirements

We note that the London airports together currently have 40-50% spare capacity available, mainly at Stansted, Luton and Southend, with early morning capacity being most scarce at Luton and Stansted²³. By 2040 there will be hardly any capacity left in the London airport system, however, as Figure 3.6 shows (Airports Commission 2013).

Figure 3.6. By 2040, London airports are predicted to be full



Source: Airports Commission 2013, p. 11

3.7 Key conclusions on the London airports system

- The London aviation market is segmented over a constellation of different airports. The capacity constraints at various airports, the market oriented approach of its (privatized) airports and the different geographical and infrastructure characteristics of the airports have over time resulted in a clear specialization of the London airports in terms of airline and passenger market segments.
- Heathrow serves the long haul premium market of business travellers, although in absolute terms most of its passengers travel for leisure. It serves many unique destinations for which consumers do not have a reasonable alternative. Heathrow is the only hub in the system, but its lack of peak-hour capacity and the relatively limited slot share of the hub carrier does not allow BA to operate a fully-fledged wave-system for arrivals and departures, resulting in a connectivity deficit relative to hub airports of a similar size elsewhere. This is in particular important as BA competes in the transfer market at Heathrow with hubs inside and outside Europe, such as Frankfurt, Amsterdam, Paris CDG, Dubai, Istanbul and Atlanta.
- Gatwick serves the long haul market as well, with a focus on leisure/ lower yielding traffic. Its strength is mainly in the short-haul international and domestic market in which it provides a third of London's connections. Low-cost has a major share at Gatwick, delivering low fares to UK consumers. The airport is well located: it is the best-connected London airport by surface access: 2.5 million people live within 30 minutes travel time and the airport has an extensive rail network.

23 Reports/Statistics on Stansted, Luton and City from Airport Coordination Ltd..

- The short haul market is more segmented. The lower yield segment is primarily served from Gatwick, Luton, Southend and Stansted. Low-cost and leisure carriers have only very limited operations at Heathrow and none at City.
- Competition between airports is strongest in the short-haul leisure segment. The offer of short-haul services is more equally distributed over the airports and leisure passengers are prepared to accept longer airport access times due to their lower travel time sensitivity. Competition between the London airports in the local OD-market is smallest in the long-haul business segment, for which Heathrow is the only alternative for 60% of the long-haul destinations. In contrast, in the long-haul transfer market of Heathrow, airport competition levels are very high.
- In absolute terms, most passengers have reasonable alternative departure airports to fly to the short-haul destination served by Heathrow and Gatwick. Given the structure of the catchment area, growth of air service supply at Gatwick will most likely result in more airline competition with services provided at Heathrow and City and to a lesser extent with those provided at Stansted and Luton. Increase in supply at Heathrow will most likely affect competition with Gatwick, City and Luton and to a lesser extent with Stansted, as far as the short-haul market is concerned.
- Overall, we conclude that the airports in the London market show distinct profiles in terms of the airline and passenger market segments they serve. The low cost /point-to-point segment has the best opportunities for growth, given the flexibility of carriers to switch between London airports, the lower sensitivity for access time of non-business passengers and the fact that Stansted, Luton and Southend are together operating at only 40-50% of their total capacity. The market for the hub operator and legacy carriers is mostly restricted to Heathrow. The same holds true for cargo, which requires the long-haul belly capacity at Heathrow. The hub carrier and partners are captive to Heathrow in the current capacity environment. Gatwick plays an important role for short-haul, point-to-point connectivity and also has a share in the long-haul market, mainly in the lower yield and leisure passenger segment.

4. Relevant factors in airport choice for airlines and other users

In the context of the available airport capacity in the South East of the UK, airline supply characteristics and the options for airport capacity expansion at either Heathrow or Gatwick, the question now is what factors will drive airline behaviour. This section brings forward market size factors, market access factors, advantages of spatial concentration, visit costs and airport service levels as important airline choice variables. It also explores the positive feedback mechanism that exists between increased connectivity, passenger choices and airline behaviour.

4.1 Factors driving airline behaviour

The decision of an airline to start or expand routes from an airport, new or existing depends on the result of the following drivers:

Table 4.1. **Factors driving airline behaviour**

Drivers	Question
Demand and yield potential	Is there sufficient demand and willingness to pay in the market to achieve a break-even yield?
Advantages of spatial concentration	When more than one airport is available in the conurbation, which airport(s) to use?
Market access	Is it possible to get access to this market?
Airport capacity	Is there sufficient capacity for (growth of) the operation?
Visit costs	What will be the cost of serving this market?
Service level and facilities	Are the services and facilities at the airport suitable for the intended operation?

Airline network decisions are a function of profitability.

It is important to note that in the end these questions are part of the airline's financial equation regarding network development, as the airline will try to maximize returns on the invested capital. Network growth in the face of airline losses is seen in the industry as far too risky, no matter the strategic reasons for network expansion. Network growth is a function of profitability.

4.2 Market size

Size and characteristics of the OD-market.

The attractiveness of a market to an airline depends first and foremost on the volume and the size of the local market and in the second place on the yield that can be achieved.

Size and strength of local OD market crucial for point-to-point carriers.

A point-to-point carrier (be it low-cost or full-service) almost fully depends on the OD market. In contrast, a hub carrier can extend the home market by adding transfer passengers. A large local market

gives the hub carrier a largely captive and stable passenger demand base that is prepared to pay a premium for the scope of direct, non-stop services out of the hub airport (Starkie 2006). In contrast, transfer traffic is much more price elastic and footloose in terms of the choice of alternative routings. It therefore delivers lower yields than local OD traffic. A large local OD market eases the hub carrier's route density problem. According to Levine (2009), the strength of the local market is the single most important hub airport success factor, because a large local market eases the route density problem. In this respect, London is a special case: it has the biggest local OD market in the world, which in theory should allow a hub carrier to establish a hub operation at one of the London airports that outperforms other European hubs. For the same reason, it is a very attractive market for point-to-point carriers.

Expected future growth in particular the inbound leisure market from Asia may increase the scope for long-haul services in the London market. An important question is if this would give Asian carriers a competitive advantage to European carriers, as inbound leisure travellers from Asia may show a preference for Asian carriers.

Business and leisure passengers value travel time differently.

A related question is how far passengers are willing to travel over land to and from the airport. Business travellers generally dislike long distances, not only with respect to the travel time involved but also with respect to the reliability of landside access times (Koster et al. 2011). Hence for airlines focusing particularly on the business segment, the catchment area is relatively small and so the airport location relative to the main population and economic centres is critical. With easy and fast access to Central London, Heathrow, Gatwick and City Airports are more attractive for business travellers, than Stansted, Luton and Southend, which lie further from the city centre.

Leisure passengers are generally willing to travel longer distances over land in return for lower fares. As a consequence, the catchment area of leisure/charter and low-cost carriers is larger and the location of the airport is less critical than for other types of passenger. As a result, low-cost carriers are more willing to use Stansted or Luton than legacy carriers. Passengers evaluate the time and monetary costs involved of the entire trip chain (e.g. Lieshout 2012) in choosing airports and airlines. This means that carriers can compensate longer surface access times/costs with lower airfares. For package tour passengers, airport and airline choice is less dependent on the passenger as the tour operator influences or even determines the departure airport and the airfare may not be a visible element in the package.

We note that the neat segmentation of business/time sensitive/price inelastic and leisure/price elastic passengers is much more nuanced in practice. The price inelastic business passenger is mostly found in larger companies, whereas the price sensitivity for small companies is on average higher. But also the other way around, certain leisure passengers and travellers visiting family or relatives may be price inelastic and time sensitive (for example, they may be premium leisure passengers or have no other alternative transport options/ no schedule flexibility).

Yield to achieve and competition level.

Heathrow is a higher yield market than Gatwick, Luton and Stansted. For this reason, it is the preferred airport for many legacy network carriers and legacy point-to-point carriers that operate at higher cost levels. The same holds true for the ultra-high yield market at London City Airport. For low cost and leisure carriers, which focus on high volume markets with lower fares at competing costs, the airport choice is more determined by visit cost and less critical from the yield point of view. Hence, low-cost and leisure carriers prefer Gatwick, Luton and Stansted at which airport charges for a typical low-cost turnaround are much lower than at Heathrow. Given scarcity in airport capacity and congestion costs

at Gatwick, the airport is less attractive for ultra-low-cost carriers such as Ryanair and Wizzair. As capacity expansion at Gatwick may increase charges, the attractiveness of Stansted and Luton in the low-cost segment may increase as far as visit cost levels are concerned.

Legacy carriers are less able to adopt a low-cost, low-fare strategy, and have to focus more predominantly on Heathrow where they can generate higher yields. As costs for operating at Heathrow are high, reflecting the high opportunity costs of the slots, regional carriers and regional operations have been gradually pushed out of Heathrow.

Recently, legacy network carriers have started to establish their own low-cost subsidiaries in order to bring down costs and compete effectively with low-cost carriers. Examples are Iberia Express, Transavia (KLM) and Germanwings (Lufthansa). This could eventually result in a larger (indirect) role of the legacy carriers at in particular Gatwick and to a lesser extent Stansted and Luton. Yet, the question is if these strategies will be successful in the long-run due to the strong position of labour unions.

Cargo marketplace.

Airfreight depends on a local ecosystem of cargo airlines, storage facilities, forwarders and ground handlers.

Cargo operators need a “cargo marketplace” of dedicated cargo facilities freight forwarders, ground handling companies and road transport companies located at and around the airport. There is a mutual relationship between the forwarders, cargo facility operators, ground handling companies and cargo operators. Cargo airlines favour airports with a strong presence of global forwarders (Kupfer 2012), a competitive ground handling market and dedicated cargo facilities. Forwarders favour airports with a strong cargo network and the flexibility to use both main-deck and belly hold cargo. There is a strong tendency to concentrate cargo.

For belly-hold cargo the schedule of passenger flights is important. Full freighter operators prefer airports with the ability to operate 24 hours a day, so for them night capacity is important.

The integrator segment does not use London as a hub.

The integrator segment (including operators such as DHL, UPS and Fedex) does not currently use any of the London airports as a hub (but they do fly some services to Stansted). They run stand-alone operations and do not need the kind of cargo marketplace described above. The airport is mainly selected for sufficient night capacity needed for 24 hour a day operation.

4.3 Advantages of spatial concentration of the network

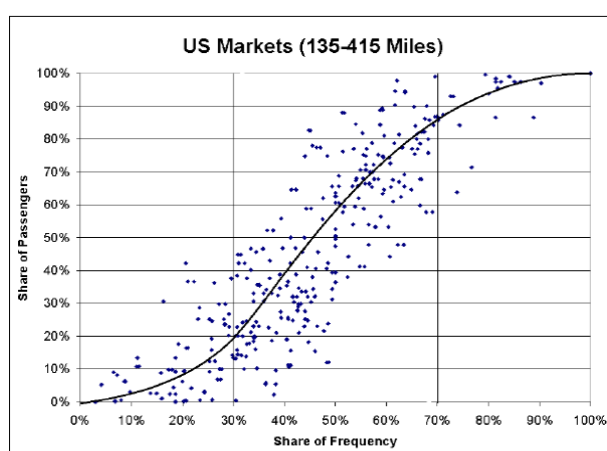
Concentration brings cost advantages.

In particular legacy airlines can achieve cost advantages by concentrating their network on a single operational base. This is because of (1) less complex aircraft scheduling, maintenance and crew planning, (2) lower average costs for handling, maintenance and other service and (3) more intensive use of capital (Reynolds-Feighan 2001; Burghouwt 2007). Hence, all other market and capacity factors being equal, airlines have a cost incentive to concentrate their operational base at a single location and avoid split operations.

Non-linear supply reactions or the “S-curve” effect.

Scheduled airlines that are able to achieve the largest frequency share on a route may benefit from a disproportionately large market share on that route (De Neufville 2005). Similarly, airlines operating a route with a low share in frequency of service may experience a disproportionate drop in market share. This “S-curve effect” triggers legacy airlines to increase frequencies and concentrate services at a single airport. The “S-curve effect” is in particular present where legacy carriers compete and weaker when low-cost competition is involved, as in the latter case price is a more important factor in competition than frequency (Figure 4.1) illustrates the S-curve for US city-pair markets, confirming that airlines with the majority of flights in a market benefit from a disproportionate market share of passengers.

Figure 4.1. **The S-curve effect of frequency and market share**



Source: InterVISTAS 2013.

Diminishing returns on frequency growth at the route level.

Following the S-curve phenomenon, further increases in already high frequency levels will not result in further increases in substantial market share or additional market generation. Hence, market saturation can be a reason for airlines to develop new routes or additional frequencies at other airports on a parallel route (De Neufville 2000).

Network economies: the single hub versus the multi-hub solution.

Hubs are factories to create route density.

The network economies associated with hub-and-spoke operations stimulate hub carriers to concentrate network growth on a single hub in each region. Hubbing advantages become disproportionately larger with a growing network (Burghouwt 2014). For the hub carrier, operating a concentrated hub-and-spoke system is one of the main elements of its business concept. It needs a base where it can operate such a system, which implies concentrations of as many flights as possible at one single airport. This enables the hub carrier to create maximum hub connectivity and to attract additional connecting traffic, higher load factors to its flights, more frequencies on existing destinations and/ or to develop new destinations. Hubs allow network carriers to create route density. Further growth of the network of the hub carrier will result in a non-linear increase of connections via the hub, triggering again more demand, higher load factors, new destinations and higher frequencies. Similar considerations may exist for alliance partners of the hub-carrier (American Airlines and Cathay Pacific in the London

context). Also for them, operating flights at the alliance partner's hub has this additional value as their flights connect to the flights of the hub carrier.

A single hub is optimal from a theoretical point of view.

For the hub carrier, deviating from the single hub solution is not optimal, at least not from a theoretical point of view. Each additional hub in the network reduces economies of density. Furthermore, additional hubs bring cost in dealing with complexity (Duedden 2006; Wojahn 2001a&b). History shows that many secondary hubs²⁴ (e.g. Milan Malpensa, Raleigh-Durham, Barcelona, Gatwick) have been closed by their respective hub carriers (Redondi et al. 2012).

Reasons to deviate from the single hub solution.

The theoretical arguments for the single hub solution 'do not leave room for the kind of multi-hub networks that many major carriers operate' as Wojahn states (2001, p. 268). Indeed, various European carriers operate multi-hub systems in the same geographical region, including Air France-KLM at Paris CDG and Amsterdam and the Lufthansa Group at Frankfurt, Munich, Zurich, Brussels and Vienna. There are reasons for hub airlines to deviate from the single hub solution in practice. These include the use of multiple hubs to achieve spatial network coverage, the level of demand on certain routes, capacity shortages at primary hubs, strategic positioning and entry deterrence and aero-political restrictions that can be circumvented by operating out of a secondary hub. Despite major steps in air transport liberalization, bilateralism still plays a major role in the development of international airline networks. As a consequence the hub carrier can only benefit from traffic rights accorded under bilateral agreements if its hub is located in its country of registration and nationality clauses still apply. Continuation of a secondary hub may also be a temporary solution after a merger or take-over but before the airline decides to rationalize the network.

Specialization in airline multi-hub networks: total market size and local OD demand.

An exploratory study of multi-hub systems operated by European airlines shows that only in large markets can hub carriers serve long-haul destinations from multiple hubs, while smaller markets are only served from a single hub (Burghouwt 2014). Within the Air France-KLM system, a clear specialization pattern between Amsterdam and Paris CDG is present: large long-haul destinations are served from both hubs (e.g. New York, Singapore), whereas smaller long-haul destinations are exclusively served from a single hub in the system, with the choice of hub dependent on which hub has the advantage in the local OD market. Generally speaking, Paris CDG has a larger local OD market than Amsterdam and thus serves most of the smaller destinations. However, on a number of smaller destinations, the local market of Amsterdam is larger than in Paris, resulting in unique service of destinations such as Manila and Jakarta from Amsterdam. The unique position of Amsterdam in certain markets relates to historical ties (Paramaribo, Jakarta, Curacao) or specific economic relations (Manila, West-Africa). In addition, aero-political constraints influence the allocation of long-haul destinations over the hubs.

Multi-hub airline strategies versus multiple hubs in the same metropolitan area.

In sum, the multiplier effect of hubbing stimulates hub carriers to concentrate hub operations on a single airport. There can, however, be reasons to deviate from the single hub solution, in particular in

24 By secondary hubs we mean that the hub is smaller in size than the primary hub in the system. BA's operation at Gatwick during the 1990s was always smaller than at Heathrow, both in terms of European as well as intercontinental flights.

large markets or where clear advantages for secondary hubs in the local OD market exist. This is not to say that carriers would favour a split hub operation over two airports within the same metropolitan area. In airport systems with multiple large airports (New York, Paris, Moscow, Tokyo), we see that airports perform different roles, either hosting competing hub carriers, or comprising one hub airport complemented with one or more airports hosting point-to-point services.

4.4 Market access and airport capacity

Availability of sufficient route density and attractive yields are of little use if a carrier cannot enter the market. Various factors determine market access.

Access to slots at convenient times.

The availability of large peak hour capacity is particularly relevant for the hub carrier and its alliance partners and other carriers wishing to connect to its hub-and-spoke system. The schedule requirements of other legacy carriers are mainly determined by the wave systems at their own hubs. But also on short-haul, point-to-point destinations, most legacy carriers prefer flying in the morning and evening peaks in order to serve the premium/ business market. Carriers that are less dependent on peak operations (point-to-point low-cost, leisure, full freighters) may prefer airports, which allow for lower peak-hour capacities.

Passengers dislike waiting at the hub; therefore hub carriers try to minimize transfer time at the airport. Minimum connecting time is a crucial decision factor in the transfer market, so hubs compete with each other on minimum connecting time. In this sense it is closely coupled with peak hour capacity. The future minimum connecting time at Gatwick or Heathrow in case of capacity expansion will be an important factor for its competitive position in the connecting market.

Night capacity.

The availability of night time capacity may be relevant for all airlines. However for some airlines, opening hours during the night, early morning and late evening are more critical than for others. Generally speaking, night capacity is important for home-based carriers, which in case of delayed arriving flights, must have the possibility to land at their home base. Most airports deliver night opening for these exceptions. Early morning capacity might be relevant for the hub airline, in case it has a connecting wave between early morning long haul arrivals (particularly from Asia before 6 am) and subsequent departures into Europe.

Availability of early morning and late evening slots important for low-cost and leisure.

Early morning and late evening capacity is important for home based leisure and low cost carriers. To optimize aircraft utilization they need to make two or three returns a day. For this reason home based leisure and low-cost carriers prefer bases and destinations with extended opening hours. Another argument is found on the demand side: contrary to business travellers these holiday makers are more willing to accept late and early arrivals/ departures in return for lower fares. Finally, there is the potential cargo integrator segment, which today does not use any of the London airports as a base.

Traffic rights.

A large market and sufficient capacity are of little use if traffic rights for operating international flights are restricted, making it difficult to provide direct routes. Hence, the portfolio of traffic rights is a

critical and indispensable success factor for hub airports, especially with regard to the intercontinental market. For the liberalized European and North-American markets, traffic rights are not an issue in the UK context. However, they are of some relevance to long-haul connections to Africa, Latin America, the Middle East and Asia (to a larger or smaller extent)²⁵.

4.5 Visit costs

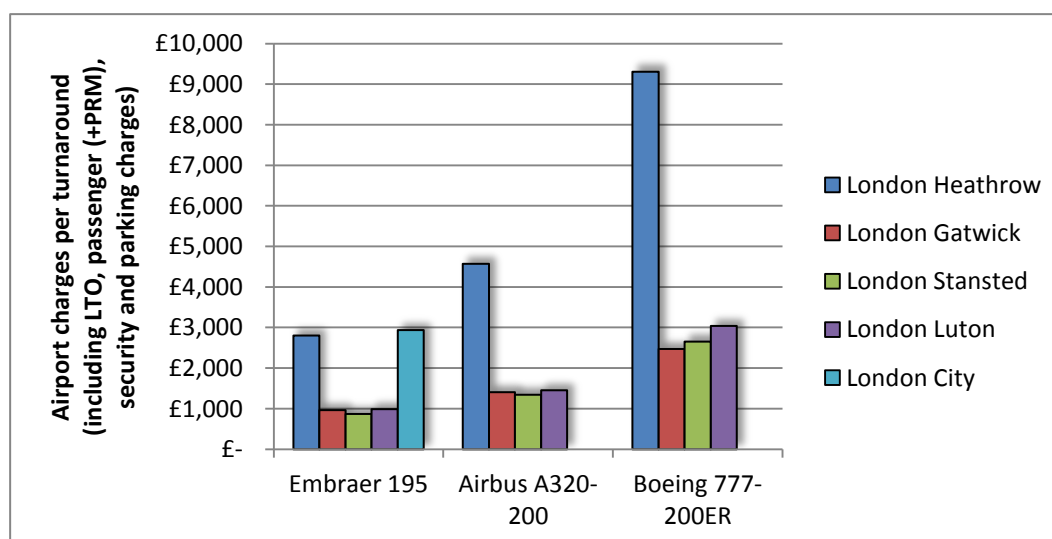
Visit costs are all costs the airline directly or indirectly faces when providing a flight to a particular airport. There may be differences in visit costs between distinct types of airlines, but such differences mostly reflect differences in service of the airport to the airlines. Visit costs include landing charges, parking charges, ground handling fees, passenger charges, security charges, fuel costs, government taxes and air traffic management costs.

Airport charges.

City and Heathrow have highest charges per passenger.

Figures 4.2 and 4.3 compare the charges per turnaround for three representative aircraft types for the London airports. Heathrow and City are clearly the most expensive airports to operate from. Gatwick, Luton and Stansted are roughly at the same level for all aircraft types, with Stansted charging the lowest fees on short-haul. Note that this figure does not include any specific airline-airport arrangements: a large share of the Gatwick and Stansted fees are negotiated in airline-airport contracts and will differ from the official charges.

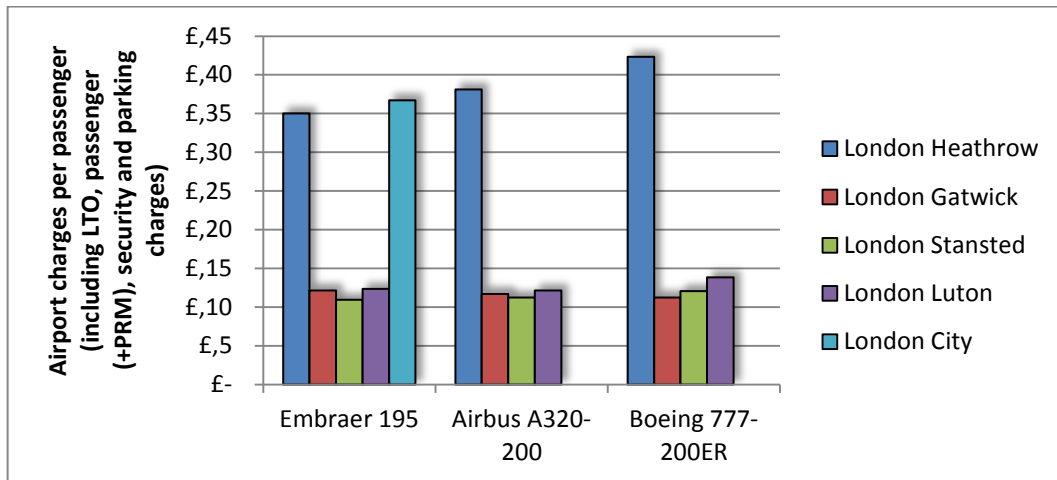
Figure 4.2. Airport charges per turnaround



Source: IATA airport charges manual; analysis SEO; Notes: LTO are landing and take-off charges; PRM charges are charges to fund needs for people with reduced mobility. Assumptions have been made on OD share (100%), representative parking time for each aircraft type and time of day/season.

25 See also Airports Commission Interim Report, section 5.9

Figure 4.3. Airport charges per departing passenger



Source: IATA airport charges manual; analysis SEO. Notes: LTO are landing and take-off charges; PRM charges are charges to fund needs for people with reduced mobility. Assumptions have been made on OD share (100%), representative parking time for each aircraft type and time of day/season. Charges are per departing passenger.

Relevance of visit costs to airlines.

Although airport visit costs generally represent a limited share of an airline's total operational costs, this share can be more significant for short haul flights as well as for low fare airlines. Typical examples of airlines with high shares of visit costs are Ryanair and EasyJet. These high shares do not result from relatively higher airport charges, but rather from minimising other operating costs, such as staff costs. Visit costs may heavily affect carriers with a large share of flights at an airport with high charges.

Airport expansion will result in an increase in charges.

Expansion is expected to result in increased charges at the expanded airport. As discussed in the previous chapter, airlines would be less sensitive to a rise of charges at Heathrow than in the case of an equivalent increase at Gatwick. This is because Heathrow is predominantly used by legacy carriers, which are less cost-sensitive than low-cost and leisure carriers. Heathrow airport handles a relatively large share of business passengers (30%), who are less sensitive to the relatively high airfares for services using Heathrow. Heathrow is less attractive to low cost and leisure carriers due to congestion, the high slot prices and high airport charges. The same holds true for regional carriers. At the same time, if passed through to the passenger, higher aero charges may negatively affect the potential in the transfer segment given the high cross-price elasticity of connecting passengers.

In the case of Gatwick expansion, airlines would be more sensitive to a rise of charges than they would be in the case of an equivalent increase at Heathrow because Gatwick has a large share of low-cost airlines, which are more cost-sensitive than legacy carriers. Compared to Heathrow, the airport handles a larger share of leisure passengers. These passengers are more sensitive to higher fares, assuming airport charges would be passed on to the consumer.

How will higher airport charges impact fares and airline behaviour?

As the competitive pressure on hub airlines increases, the factor of competitive visit costs becomes more important. Airport visit costs (and increases in these costs) cannot always be passed on to

passengers in the form of higher airfares, at least not in the short-run. Particularly if high competition levels exist with a high (substitution) price elasticity, these charges are absorbed by the airlines. With limited profit margins, the effects of an increase in airport charges can be significant.

Absorption of (increased) airport charges is likely to be a short-term reaction, while in the longer run in a competitive market airlines are expected to pass on higher cost to the passengers if all airlines are faced with the cost increase. In the long run, in the absence of alternatives, higher airport charges may either affect the connectivity on offer at a hub airport or negatively influence the airline's bottom line. Increases in airport charges (even if small) that are passed on to the passenger will influence behaviour of the marginal passenger, in particular in the price-elastic transfer passengers and in local OD markets where the passenger has a choice between different departure airports. Alternatively, the carrier may – as a result of declining load factors – decide to reduce its supply in the market (smaller aircraft, lower frequencies).

However, at a constrained airport such as Heathrow with substantial excess demand and airline scarcity rents (see also section 5.5), the impact is different: increases in airport charges result in a fall in airline scarcity rents/ airline margins, instead of a rise in fare levels. This fall will further be accentuated if capacity would be increased, because competition will drive down fares to a (higher) cost base.

The fact that yields at Heathrow (25 US cents per passenger mile in 2012) are substantially higher than at Gatwick (10 US cents per passenger mile in 2012) (Airports Commission 2013, p.62) may be a reflection of the larger excess demand and airline economic rents at Heathrow.

Airport-airline contracts.

We observe that the cost of access to airport infrastructure is increasingly subject to airport-airline contracts in the current liberalized European aviation market where airport competition is intensifying and airports are increasingly acting as commercial enterprises (Copenhagen Economics 2012; Starkie 2012). In particular in the UK, airport-airline contracts play an important role where airports attract new services by offering airlines discounted charges in return for long term commercial guarantees from the airlines. Under its current airport license, the UK regulator has allowed Gatwick to negotiate contracts with individual airlines. Airport-airline contracts are likely to increase competition between airports in the market for airline services.

Slot prices.

Slot trading has brought the opportunity costs of slots into the airline's financial equations.

Heathrow and Gatwick airports have the most developed and transparent secondary slot trading market in Europe, which has brought the opportunity costs of slots into the airlines' financial equations (Bush 2014). Slots are traded for substantial amounts of money, particularly Heathrow peak-slots, reflecting high-yield opportunities at the airport. The capacity constraints at both airports have driven up slot prices. Slots traded are generally used for longer haul and higher capacity flights, which indicates that secondary slot trading creates a situation in which slots at the congested airports are used by those carriers with the highest willingness to pay. Buying carriers are generally the hub carrier and other large network carriers, which are able to utilize slots better in their networks, not only on the flights using the slots but also on the connections they enable. Selling airlines tend to be financially weak network airlines, regional point-to-point airlines and carriers that have an alternative elsewhere in the airports system.

In addition to capacity constraints that tend to crowd-out short-haul, low-yield flights over time, the secondary market further stimulates a concentration of long haul, high capacity traffic at congested airports.

Impacts on slot prices are probably modest if capacity is added gradually.

Expanding Heathrow or Gatwick could put downward pressure on slot prices in the secondary market, in particular if large amounts of slots become available in the same season. Such a development could also jeopardize the liquidity of the market before the capacity becomes available, as airlines will not buy expensive slots when they know slots will become available through the regular allocation procedure at no cost. If capacity were to be added only gradually, effects on slot prices and the secondary market would be smaller.

Sunk costs

Sunk costs are an important factor in anchoring carriers to an airport. Sunk costs include investments in special passenger facilities, offices, maintenance facilities, brand building and staff. Especially for home based carriers that already operate from the airport for many years, it can be a barrier to exit the market at that airport and start up an operation elsewhere. This explains the general reluctance of low-cost carriers to invest in their own facilities at airports. Legacy carriers have in contrast relatively recently invested in Terminal 2 and Terminal 5 at Heathrow, which may inhibit them from moving their operations elsewhere. The same applies to non-UK carriers that would like to start-up a substantial operation at one of the London airports: they would have to invest heavily in branding to attract passengers.

4.6 Congestion costs

Airport congestion, in the form of delays, holding times and lengthy taxiing times, increases operating costs for airlines. In particular low-cost carriers try to avoid congested airports in order to achieve a cost efficient operation. Delays at Gatwick and Heathrow are expected to decrease after adding capacity²⁶.

4.7 Airport facilities and service level

Availability of maintenance facilities

Home carriers may heavily invest in maintenance facilities at the home base. These investments also involve substantial sunk costs in facilities and staff, which may be an important reason for staying at an airport. For non-home based carriers facilities for line maintenance are important, but not a decisive factor in airport choice.

26 As a rule of thumb, airports with six runways or more can be expected to suffer from inefficiencies in the airport operation (long taxiing times, runway crossings etc.). However, with expansion of Heathrow or Gatwick, this simple threshold is still far away.

Service level and passenger experience.

Dissatisfiers and satisfiers.

For keeping and attracting passengers, airlines compete with services that improve the passenger experience. The airport plays an important role in providing these services. The most important factors are those dissatisfiers that drive passengers to use other airports. Mostly they concern walking distances and waiting times for security, immigration and luggage. Satisfiers also contribute to a better passenger experience. They are mostly related to the layout of terminals, shopping facilities, atmosphere and space, cleanliness, friendliness of staff and availability of dedicated lounges. Together they determine the image of an airport and its perceived value by passengers.

We note that part of the service level is actually outside the airport's sphere of influence, as the government largely determines service factors such as border controls.

4.8 Summary of driving factors

Table 4.2 summarizes the key factors that are likely to affect the behaviour of airlines within the London airport system. The importance of the factors that drive the airline's choice of airport and its subsequent network development at the airport are different for each of the airline segments. Some of these factors can be categorized as 'deterrence' factors: they incentivize airlines to search for substitute airports, such as high airport charges. The majority of them are 'pull' factors: they incentivize airlines to concentrate services at a certain airport, such as a large OD market or high sunk costs

Table 4.2 Key driving factors for airline behaviour by airline segment

Driving factors	Hub Carrier and partners	Other Legacy*	LCC Point-to-Point	Leisure	Dedicated Full Freighter	Integrators
Market size						
OD-market size	+++	+++	++	+++	+++	+
Yield and competition level	+++	+++	+	+	+	+
Cargo marketplace	+++	++			+++	+
Network concentration advantages						
Cost advantages	+++	++	+	+	+	+++
Non-linear supply effects	++	++				
Network economies	+++					
Market access						
Availability of (peak hour) capacity	+++	+	+			+++
Night capacity	++		++	++	++	+++
Congestion costs ¶	+++	++	+++	+		+++
Traffic rights	++	++			++	
Costs						
Airport charges and taxes ¶	+	+	+++	+++	+++	++
Slot prices ¶	+	+	+++	+++	+++	++
Sunk costs	+++	++	+	+	+	++
Airport facilities and service level						
Maintenance facilities	+++	+	+			
Service level	++	++	+	+	+	

Key: +++ very important for airport choice, ++ important in airport.

Notes: * Including non-home based network carriers and homebased legacy point-to-point carriers; deterrence factors have been marked with ¶.

4.9 Positive feedback loop between connectivity growth and user behaviour

The mutual relationship between airport connectivity and passenger/ user behaviour.

The connectivity offered in the London airports system interacts with passenger behaviour. According to Hansen (1995), there is a positive feedback mechanism between airport choice and network development by the airline and passenger/ user behaviour. Growth in the network on offer will decrease travel costs for consumers/ users due to higher frequencies, more destinations and more competition/ lower fares. Hence, the airport will attract more demand from and to its hinterland, which increases the

likelihood of further connectivity growth by the airline. In other words, growth of the network at a certain airport within a multi-airport system tends to reinforce itself over time. This results in a dominant role for a single airport within the multi-airport system, until capacity constraints arise and/or the OD market reaches a certain level (as in the case of London).

Availability, air fares, access time, frequency and loyalty schemes most important choice variables.

Regarding passenger choice itself, many empirical studies have identified the most important variables. Generally speaking, the literature brings forward the availability of destinations, ticket price, access time, frequency and loyalty programmes as the most important choice variables. Their importance differs by passenger segment. We have summarized the factors for aviation users below. The passenger choice factors need to be considered in order to assess the competitive outcome of different airline response scenarios in the next chapter.

Table 4.3. **Key factors in choices made by air transport users**

Segment	Determining factors
Business	Frequency (availability of flights) Elapsed travel time (access, flight and connecting) Reliability of landside access Airfare Shopping facilities Frequent Flyer Programmes Corporate contracts Airport/ airline awareness and past use
Leisure	Airfare Availability of flights Shopping facilities Reliable land access Elapsed travel time (access, flight, connecting) Airport/ airline awareness and past use
Visiting Friends and Relatives	Similar to leisure segment Destination is critical Frequent Flyer Programmes Airport awareness and past use
Cargo forwarders	Scheduled (long haul) belly capacity (Scheduled) full freighter capacity Available handling facilities Competitive cargo markets (fares) Reliable land access

4.10 Performance of the London airports with respect to the airline drivers

London airports perform differently on driving factors

Because of the differences in infrastructure, location, traffic and regulatory environment, the London airports perform differently on airport driving factors. These differences partly explain (but are also the result of) the current specialization within the system as described in chapter 3.

Table 4.4 Each London airport performs differently with respect to the factors driving airline behaviour

Driving factors	Heathrow	Gatwick	City	Stansted	Luton
Market size					
Catchment area size: number of inhabitants within 100km	18.5 mln	16.9 mln	17.6 mln	16.7 mln	17.7 mln
Yield	High	Low	High	Low	Low
Cargo marketplace	Strong	Weak	Absent	Weak	Very weak
Network concentration advantages					
Relevance of cost advantages of network concentration	Strong for home carriers	Strong for home carriers	Weak (niche market)	Present for home carriers	Present for home carriers
Relevance of non-linear supply effects	Strong	Medium	Strong	Weak	Weak
Relevance of network economies related to hub-and-spoke network	Strong for hub carrier	Weak	Absent	Absent	Absent
Market access					
Declared (peak hour) capacity	88/hr.	55/hr.	N.a.	29/hr.	42/hr.
Night capacity	3 250 (mvt limit S15) 4 080 (noise limit S14)	11 200 (mvt limit S15) 6 200 (noise limit S15)	0	7 000 (mvt limit S15) 4 650 (noise limit S15)	Regulated by noise contours
Congestion costs	High	High	High	Low	Low
Relevance of availability of traffic rights	Very relevant	Relevant	Not relevant	Small relevance	Small relevance
Costs					
Airport charges and taxes	High	Low	High	Low	Low
Slot prices	High	Low	N.a.	N.a.	N.a.
Sunk costs	Very relevant for home based carriers	Very relevant for home based carriers	Relevant for home based carriers		
Airport facilities and service level					
Maintenance facilities	Unclear	Unclear	Very limited	Unclear	Unclear
Service level	High	High	High	Medium	Medium

Source: Airport Coordination Limited.

Capacity expansion will alter performance of London airports regarding the driving factors

Adding capacity to either Heathrow or Gatwick will change the (relative) performance of the facilities with respect to the following drivers:

- Declared peak-hour capacity at Gatwick and Heathrow would rise to about 98 and 128 movements per hour respectively
- Airport charges will rise following Heathrow or Gatwick expansion. At capacity constrained airports with substantial excess demand, capacity expansion will result in a decrease in airline scarcity rents and thus lower fares for the consumer. Higher charges will lead to a further fall in scarcity rents/ airline margins.
- Capacity expansion will have a moderating effect on the increase in slot prices or may even lead to lower slot prices, depending how capacity is added to the market.
- Congestion costs will most likely go down, as both airports will not operate at full capacity anymore.
- Adding capacity at both Gatwick and Heathrow will give more opportunities to develop or strengthen the cargo marketplace, not least because of the expected increase in belly hold freight capacity.

4.11 Key conclusions on factors that drive airline and user behaviour

A multitude of factors drive airline behaviour in the London airport system but impacts on the financial performance of airlines matter most.

Airlines try to maximize their financial return on invested capital and airline managers have to meet financial targets. Growth of the network is generally only possible when financial targets are being met. Proposed growth in the context of corporate losses is seen as far too risky. Network growth is a function of profitability. Underlying factors that drive airline network behaviour and financial performance include size of the local market, airport visit costs, congestion costs, advantages of spatial concentration, service levels and access to capacity.

Size and strength of the local market is of primary importance for all airline segments.

For all airline market segments, the size and strength (yield) of the local market is of primary importance. The London local OD market is the largest and strongest in the world. Non-home based network carriers, low-cost carriers, leisure/ charter carriers and home based legacy point-to-point carriers fully depend on the size and strength of the local OD market from and to London. Only the hub carrier British Airways and partners are able to really ‘extend’ the local market by carrying transfer traffic via their hub. Also other carriers can benefit from the hub carrier’s connectivity as passengers may interline or self-hub although these self-connect and interline volumes are relatively limited. Due to the specific user requirements of the hub carrier (peak-hour capacity, minimum connecting time) and characteristics of its business model, the hub carrier is currently captive to the Heathrow location. This might change if Gatwick were to increase its capacity.

Low-cost, leisure and cargo traffic is sensitive to visit and congestion costs.

Low-cost, leisure carriers and all-cargo airlines are relatively sensitive to visit and congestion costs. For them, the charges are a considerable part of their operating costs.

For passenger carriers, the lumpiness of seat capacity leverages elasticity in relation to airport charges. Traffic rights, peak-hour capacity, short connecting times and network concentration are less relevant to their airport choice behaviour. Stansted, Luton and Gatwick are in particular attractive to low-cost and leisure carriers given their much lower charges levels than City and Heathrow. The large local market for leisure traffic and excellent surface access makes Gatwick in particular attractive for leisure/charter carriers, higher end low-cost carriers and legacy point-to-point airlines.

Expansion of Gatwick or Heathrow will ultimately result in an increase in charges at the expanded airport.

Airport charges are likely to increase following Gatwick or Heathrow expansion. At capacity-constrained airports with substantial excess demand, expansion will result in a decrease in airline scarcity rents, with potentially lower fares for consumers. Fare levels may not decline overall, however, as the level of aero charges will go up at the same time. On balance Airlines are unlikely to increase airfares. Instead, higher charges will lead to a fall in scarcity rents/ airline margins. In other words, the increase in airport charges following expansion leads to a further reduction in airline margins, as competition brings fares closer to a (higher) cost base.

Carriers tend to spatially concentrate network growth.

The scale and scope economies of network concentration, the “S-curve” effect and network economies are important reasons why carriers tend to concentrate network growth on a single location in the same city. These factors are stronger for legacy carriers than for low-cost carriers and stronger for growing markets than for maturing markets. Network economies are the reason hub carriers concentrate their network at a single airport.

There are reasons for some network carriers to have more than one hub.

From a theoretical point of view, network carriers prefer a single hub network. However, there can be reasons for a hub carrier to deviate from the single hub solution. Adding capacity to Gatwick might allow for a secondary hub operation by a competing hub carrier. A split hub operation by British Airways at both Heathrow and Gatwick is not likely to be an efficient network solution.

Capacity expansion will change the performance of the London airports with respect to drivers of airline behaviour.

Adding capacity to either Heathrow or Gatwick will change the (relative) performance of the airports in the London system. These changes relate primarily to (peak-) hour capacity, visit costs/charges, congestion costs, slot prices, service levels and the cargo marketplace.

5. Airline response for different capacity expansion options

Based on an analysis of the London airports system, key drivers for airline behaviour and the options for capacity expansion at either Gatwick or Heathrow, we have developed 6 different airline responses. The airline responses have different impacts on the structure of traffic in the London airport system as well as on connectivity, competition and reduction of airline rents to the benefit of the consumer.

5.1 Introduction

This chapter addresses the potential implications of capacity increases at Heathrow and Gatwick on airline behaviour. Firstly, we address the extent to which airline behaviour may change, taking into consideration the driving factors for each airline segment and the characteristics of London airports. We do this by elaborating a number of airline response scenarios for each airport capacity expansion option. Secondly, we qualitatively assess the potential effects on connectivity, competition and reduction of airline economic rents to the benefit of the aviation users.

5.2 Airline responses

We foresee the following airline responses for the London airports system:

Heathrow expansion option

- Airline response 1: Hub carrier growth at Heathrow, point-to-point growth at Gatwick.
- Airline response 2: Two hub operations at Heathrow, point-to-point growth at Gatwick.
- Airline response 3: Point-to-point growth at Heathrow and Gatwick, Heathrow remains network hub.

Gatwick expansion option

- Airline response 4: Hub operation at Heathrow and a competing hub operation at Gatwick.
- Airline response 5: Partnerships – Gatwick becomes a low-cost “gateway”, Heathrow remains the network hub.
- Airline response 6: Gatwick point-to-point growth, Heathrow remains the network hub.

For each airline response, we will discuss the assumed airline responses to capacity expansion, as well as first notions on the possible implications for connectivity, competition and consumers. The airline responses will then be assessed for competitive impacts.

Regulatory framework.

The CAA is responsible for the economic regulation of UK airports. It has recently published a draft policy statement on the regulation of new airport capacity²⁷ that sets out the principles that it will apply under any future regulatory regime as follows.

- “Risk should be allocated to those parties who can best manage it. This approach is most likely to protect users' interests (that is, the interests of passengers and those with a beneficial interest in freight), by producing the lowest expected out-turn cost (as incentives to manage the cost are maintained) and by revealing information about parties' valuation of risk”.
- “Commercial negotiations should be encouraged. If a commercial agreement to underpin expansion is possible, it could incentivise efficiency, ensure that risks are borne by those best able to manage them, reveal information about parties' valuation of risk, and avoid any unnecessary regulatory intervention”.
- “Capacity can be paid for both before and after it opens. Whether pre-funding arises through the natural operation of a market or through regulatory intervention, some measure of pre-funding may be in users' interests”.

Whilst the draft policy statement does not constitute a detailed regulatory regime, the Airports Commission does not consider that the application of the above principles would be likely to create significantly different impacts in any of the scenarios for airline industry development.

In developing the airline responses, we thus assume no substantial changes in the regulatory framework for the London airports in the future.

The airline industry is highly dynamic.

The airline industry is dynamic and has shown remarkable changes since the start of EU liberalization in the early 1990s, including the rise of new business models and adaptation of existing ones. As it will take another 10 years before new runway capacity becomes available in the London airports system²⁸, the possibility of future developments in the aviation market that result in paradigm shifts in airline business models should be taken into account.

Likelihood of each airline response depends on how the aviation sector will develop.

Therefore, in this chapter we describe the possible airline responses and how they would impact on connectivity, competition and reduction of airline rents to the benefit of aviation users. As not all airline responses are likely in every macro-economic future, we also need to assess the likelihood of the airline responses. Chapter 6 discusses the likelihood of the airline responses by considering a number of possible developments in airline business models and macro-economic conditions, based on the Airports Commission scenarios.

27 <http://www.caa.co.uk/docs/2888/CAP1221.pdf>

28 The proposals submitted to the Airports Commission by GAL, HHL and HAL indicate that it would be possible to open the second runway at Gatwick in 2025, and either of the two capacity expansion proposals at Heathrow could be operational in 2026.

5.3 Expanding Heathrow

Airline response 1: Hub carrier growth at Heathrow, Gatwick point-to-point growth.

A capacity increase at Heathrow implies the construction of a third parallel runway or extension of the north runway to the west. This could raise yearly capacity to 700-740 000 movements at a peak-hour capacity of 128 movements per hour. Once the new runway is opened, it will most likely not lead to an immediate increase of the peak hour capacity, measured in number of hourly aircraft movements. Stepwise capacity increases are more likely. Currently, terminal and runway capacity is unbalanced. Terminal 5 and Terminal 2 have led to a significant increase in terminal capacity, while the runway capacity has been kept unchanged. With the third runway at Heathrow or expanding the north runway to the west, the two capacity items will become more balanced.

Hub carrier and alliance partners show strong growth.

The ability of the hub carrier to operate a hub-and-spoke system will improve once a third runway is operational. We would expect the hub carrier to acquire slots through the regular slot allocation procedure first, before buying slots from incumbents or new entrants. However, when the new capacity also reaches its limits, the hub carrier and other legacy long haul carriers are likely to be net buyers of traded slots.

The additional capacity enables the hub carrier to shift the sub-optimal hub-and-spoke system of today into a more efficient wave-system with clearly defined arrival and departure waves. Due to scarcity at Heathrow BA has also allocated 13% of its long haul flight seats to Gatwick. Hence, in this scenario the current Gatwick flights of the hub carrier, both long and short-haul would move to Heathrow. This corresponds to some 60 additional flights per day of the hub carrier possible at Heathrow. On top of this, we would expect the hub carrier to further develop its network at Heathrow. In a maximum scenario of a capacity of 700 000-740 000 movements per year, assuming that capacity will be allocated 50% to new entrants and that British Airways will have a share of 52% in the remaining new slots, this number could rise to 80-90 hub departures per day.

Another possibility is that British Airways will keep using its Gatwick slots for its own (low cost) flights as it currently operates a rather profitable short-haul operation out of Gatwick with lower yield flights, which it may not want to abandon fully. Transfer to a low cost subsidiary/ partner (such as Vueling) may be an option.

Connectivity growth and the hub carrier's financial performance.

It is difficult to foresee to what extent the hub carrier will use the additional capacity at Heathrow to increase frequencies/ capacity in existing markets or focus network growth on new destinations. Both strategies enhance connectivity (see section 5.5) on the concept of connectivity) but in different ways and with different broader economic value. British Airways' network portfolio in an expanded Heathrow will track to financials. If expanding capacity in existing markets would be seen as producing greater returns than developing new markets, then that would be the first order of priority, and vice versa. Which is most profitable will depend amongst other things on the level of latent demand in the current restricted capacity environment that cannot be served, as well as the extent to which the high Heathrow aerocharges can be passed through in the OD and transfer segments.

Expected charges increase impacts on hub performance.

Airport charges will increase because of the costs involved in expanding Heathrow. This increase will favour high capacity services into the UK domestic airports and will discourage airlines from flying high frequency, low capacity services to tertiary points in the UK and elsewhere in Europe. For the hub carrier this means that its feeder network into the UK and the rest of Europe will grow, but without the same degree of penetration to small cities as at Amsterdam or Frankfurt. Given the severe competition in the transfer market, it is unlikely that the hub carrier will pass through higher charges to transfer passengers on existing destinations, as it would face significant declines in market share. A stronger differentiation in passenger charges (transfer versus OD) than is currently the case at Heathrow might be a way to compensate for the expected stronger effects in the transfer market. All in all, a further increase in charges together with a reduction in airline economic rents at Heathrow may jeopardize development of lower yield, short-haul feeder flights at Heathrow.

With respect to the development of new routes, the carrier may focus on routes with relatively high levels of OD demand, which provide the carrier with more opportunities to pass through higher charges to its passengers.

Point-to-point legacy, non-home-based network carriers.

Other non-home-based network carriers such as Delta and Emirates are also likely to benefit from the increase in capacity at Heathrow and can be expected to grow their network at Heathrow and increase flights from Heathrow to their own hubs. Also a legacy point-to-point carrier such as Virgin Atlantic can be expected to increase its slot share. In particular network carriers from Asia may disproportionately benefit from brand loyalty in their own home market as inbound long-haul traffic is expected to grow faster than outbound traffic. Certain network carriers with a larger share of low yield traffic may increasingly prefer Gatwick to Heathrow as Heathrow charges are expected to increase.

Low-cost and leisure carriers are not likely to take up Heathrow slots.

There is little expectation that low-cost or leisure carriers will acquire Heathrow slots through the secondary slot market. Apart from the slots they may acquire through the regular slot allocation procedure, they may prefer operating at Gatwick, as soon as more capacity becomes available at Gatwick after a possible migration of the hub carrier and other legacy operations to Heathrow.

Opportunities in the cargo marketplace.

Growth in long-haul belly capacity at Heathrow is expected to further strengthen Heathrow's role as a cargo marketplace. But it is not likely that the full-freighter segment will flourish at any significant scale, given its low yield character.

Connectivity impacts.

With implementation of a fully-fledged wave system for arrivals and departures, the number of connections via Heathrow and the number of transfer passengers using Heathrow can be expected to grow considerably. Connections with a transfer at Heathrow could increase substantially, taking into account the hub multiplier effect (measuring connectivity in terms of number of destinations and frequencies is outside the scope of the paper and the Airports Commission is looking into these impacts using its own aviation demand model). This would give Heathrow a stronger position in the connecting market and strengthen the customer base, allowing it to surpass the threshold for adding a range of new long haul and short-haul routes. It is, however, difficult to predict exactly what balance the hub carrier

will strike in the use of additional capacity between increasing capacity (aircraft size/frequencies) on existing routes and developing new destinations. Non-home-based network carriers will further contribute to the connectivity growth at Heathrow. Connectivity from/ to the domestic UK airports via Heathrow may increase, decreasing the role of foreign hub airports such as Amsterdam in the UK market. At the same time, the high charges at Heathrow will limit the degree of penetration into the European and UK feeder market and this is likely to remain smaller than that of hub airports such as Frankfurt and Amsterdam²⁹.

Impacts for Gatwick and the other London airports: inbound leisure demand from Asia.

In this scenario, Heathrow expansion results in a cascade effect in the London airport system: the growth of the hub operator and partners at Heathrow will free up capacity for non-legacy carriers at Gatwick or for a (new) British Airways low-cost subsidiary, to which BA is entitled to hand over slots for free according to the existing slot allocation rules, leading to a more pronounced role of Gatwick as a point-to-point low-cost and leisure airport. Such a development could relatively weaken the role of Stansted and Luton in this particular market. The expected increase of inbound versus outbound long-haul traffic and growth of leisure demand from Asia may also provide opportunities for non-home based network carriers and long-haul low-cost carriers at Gatwick as well.

Impact for competition and consumers: better connectivity to the hinterland.

From the point of view of the consumer one can expect a better access through a more extensive British Airways network to the domestic and European hinterland by air. However, the expected higher airport charges will discourage high frequency, low capacity feeder flights into Heathrow. The probability of new long-haul direct flights from UK regional airports will also diminish.

From the point of view of the airlines, the connectivity of the British Airways network and its alliance partners will improve with regard to intercontinental as well as European routes. Competition with other hubs in Europe will intensify to the benefit of British Airways and Heathrow. On the other hand, long-haul non-Oneworld hub carriers from other continents will intensify competition with British Airways by redirecting lower yield passengers through their own hubs after intensifying their frequencies of service at Heathrow or Gatwick. BA and Oneworld partners will have a more dominant position, in particular regarding long-haul flights, further enforced by loyalty programmes and contracts with large corporations.

Short-haul competition in the local market may increase.

Short-haul competition in the OD market may increase, in particular at Gatwick and City airports as BA moves some of its flights there to Heathrow. Airlines at Heathrow will face increasing competition from low-cost carriers at Gatwick.

29 Although some domestic routes may be designated as Public Service Obligations.

Figure 5.1. **Summary of airline response 1: Hub carrier growth at Heathrow, point-to-point growth at Gatwick.**

↑ Increase in flights ↓ Decrease in flights	Heathrow	Gatwick	Other London Airports
Hub carrier and partners	↑	↓	↔
Other non-home-based network carriers	↑	↑ ↔	↔
Point-to-point legacy	↑	↑	↔
Low-cost	↔	↑	↔ ↓
Charter	↔	↑	↑
Cargo	↑	↔	↔

Airline response 2: Two hub operations at Heathrow, point-to-point growth at Gatwick

Competing hub carrier enters the Heathrow market.

A second airline response is the development of a dual, competing hub operation at Heathrow. Given the exceptional strength of the London OD market and on-going liberalization of aviation markets, a second alliance or non-allied carrier could consolidate at Heathrow by acquiring slots through the regular slot allocation procedure and the secondary slot market or by taking over/ cooperating with carriers that already have a substantial presence at Heathrow.

Although such a scenario may seem unlikely at first glance, today's industry gives various examples of how this could manifest itself. Jet Airways India operates a stand-alone scissor³⁰ hub at Brussels (besides the hub operation of Brussels Airlines) to connect India with the US, using a portfolio of 5th freedom traffic rights. Hence, the availability of 5th freedom rights from Asia via Heathrow to North America could be a stimulus for such a hub operation. Etihad is acquiring equity shares in various airlines around the world to build its global network and generate feeder on endpoints in their own network. A similar step could be envisaged in the UK market, which provides an opportunity to build up a network out of Heathrow, backed by a financially strong foreign carrier. The same network development could be envisaged for Gatwick (see section 5.4). Another possibility could be the transformation of the business model of an existing long haul, home-based legacy point-to-point carrier such as Virgin Atlantic into a business model that includes a dedicated short-haul feeder network.

Hub carrier and partners.

The current hub carrier and partners will expand their network along the lines of airline response 1, albeit to a smaller extent, but the alliance could become less dominant as the second hub carrier takes up a significant share of the slots.

30 Using 5th freedom rights, Jet Airways flies into Brussels airport from multiple origins in India within a single time window, using wide-body aircraft. Passengers change planes at Brussels and the aircraft depart within a single time window to various destinations in North America.

Other network carriers and point-to-point legacy carriers.

Existing or new non-home-based network carriers will expand long-haul and possibly short-haul services out of Heathrow. In particular network carriers from Asia may disproportionately benefit from brand loyalty in their own home market as in the future inbound long-haul traffic is expected to grow faster than outbound traffic.

The new hub operation is likely to be of a smaller size than that of the existing hub carrier but depending on its scale, the development of a second hub operation may leave less room for other competing non-home-based network carriers at Heathrow.

The move into Heathrow would be a risky strategy for the new hub carrier, due to the expected head-to-head competition with the incumbent hub carrier, the expected rise in charges as well as the reduction in airline economic rents following expansion of capacity.

Low-cost and leisure carriers

Low-cost and leisure will develop along the same lines as under airline response 1.

Cargo

Cargo will develop along the same line as under airline response 1

Connectivity impacts and impact on consumers.

From a connectivity perspective, such an airline response seems to be less effective: the sharing of scarce hub airport capacity between competing airlines will result in a suboptimal level of connectivity provided via Heathrow because competing hub carriers will not sell connections between each other's flights. The sum of connections of two separate hub operations is lower than one single hub operations of the combined size. Hence the opportunities to achieve sufficient route density for new destinations and frequencies may be lower than under scenario 1.

On the other hand, a second hub operation at Heathrow will lead to an increase in competition both in the OD market and transfer market, with more choice and lower fares for the consumer as a result compared to airline response 1, depending on the extent to which the network of the two hub carriers overlaps. The new hub carrier may search for new markets so as to avoid direct head-to-head competition with the existing hub carrier. This would add to the connectivity profile of London in terms of destinations served.

Impacts on Gatwick and the other London airports: capacity at Gatwick unaffected.

The growth of the second hub carrier at Heathrow could well be “autonomous” growth, albeit at a smaller scale than the incumbent hub carrier, thus not involve any migration of capacity from elsewhere in the London airports system to Heathrow. This means that the capacity at Gatwick remains relatively unaffected, although competition to the Gatwick short-haul and long haul services will increase. Hence, no further cascade-effects in the rest of the London airport system are assumed.

Figure 5.2. **Summary of airline response 2: Two hubs at Heathrow, Gatwick point-to-point**

↑ Increase in flights ↓ Decrease in flights	Heathrow	Gatwick	Other London Airports
Hub carrier and partners	↑	↔	↔
Other non-home-based network carriers	↑ ↔	↑ ↔	↔
Point-to-point legacy	↓ ↔	↔	↔
Low-cost	↔	↔	↔
Charter	↔	↔	↔
Cargo	↑	↔	↔

Airline response 3: point-to-point growth at Heathrow and Gatwick. Heathrow remains network hub

A third possible airline response following Heathrow expansion is growth of point-to-point traffic at both Heathrow and Gatwick. This assumes a saturating European low-cost, point-to-point market. As the number of short-haul OD-markets that European low-cost carriers can serve is essentially limited, low-cost carriers serve longer routes, ‘thinner’ routes at lower frequency and search for premium traffic at primary airports. Despite the much higher charges at Heathrow, low-cost airlines establish a significant operational base at Heathrow to target the premium market, while keeping up their operations at Gatwick. Furthermore, additional slots are taken up by visiting network carriers and legacy point-to-point carriers.

Home-based hub carrier and partners: limited growth.

BA and partners will maintain their operations from Heathrow. As the network business model is under pressure from low-cost carriers on the short-haul market and non-EU network carriers on long-haul, the hub carrier is not able to benefit from the increased capacity and grow its hub operation. Direct competition to the hub carrier increases substantially on the short-haul market and to a lesser extent on the long-haul market.

Other network carriers and point-to-point legacy carriers.

Home-based point-to-point legacy carriers such as Virgin Atlantic expand their operations at Heathrow. In addition, the share of visiting network carriers at Heathrow, both on short-haul and long-haul markets increases. In particular visiting network carriers from Asia may disproportionately benefit from brand loyalty in their own home market as inbound long-haul traffic grows faster than outbound traffic. Network carriers at Gatwick shift part of their operations to Heathrow.

Low-cost and leisure carriers.

Low-cost carriers focus network growth at Heathrow but maintain operations at Gatwick. The Heathrow opportunity may come to the detriment of low-cost operations at Stansted and Luton.

Opportunities in the cargo marketplace.

Growth in long-haul belly capacity at Heathrow is expected to further strengthen Heathrow's role as a cargo marketplace, but to a lesser extent than under airline responses 1 and 2 given the increased role of the low-cost segment. In addition, it is not likely that the full-freighter segment will flourish at any significant scale, given its low yield character.

Connectivity impacts and impact on consumers.

Point-to-point, low-cost competition at Heathrow, together with reduction of scarcity rents/excess demand and a declining market share of the hub carrier, translates into lower fares for consumers. Connectivity will increase in both short-haul and long-haul markets. In comparison to airline responses 1 and 2, long-haul connectivity growth is smaller as no/only modest growth of the hub operation is foreseen for this airline response.

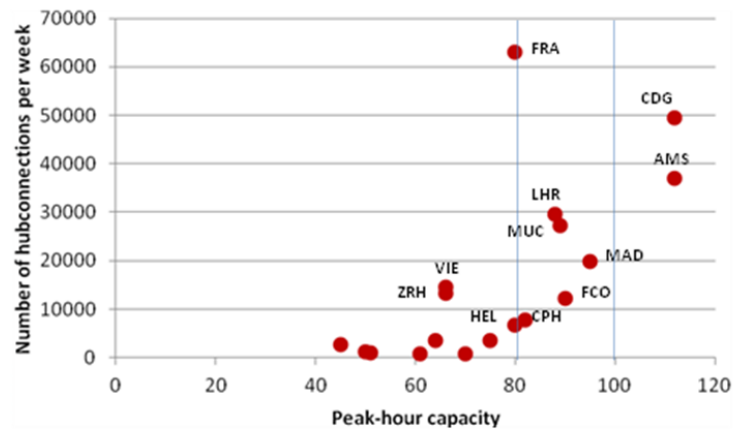
Figure 5.3. Summary of airline response 3: point-to-point growth at Heathrow and Gatwick, Heathrow remains network hub

↑ Increase in flights ↓ Decrease in flights	Heathrow	Gatwick	Other London Airports
Hub carrier and partners	↔	↑	↔
Other non-home-based network carriers	↑	↓	↔
Point-to-point legacy	↑	↓	↔
Low-cost	↑	↔	↔ ↓
Charter	↔	↔	↔
Cargo	↑	↔	↔

5.4 Expanding Gatwick

Airline response 4: hub operation at Gatwick and hub operation at Heathrow

Expansion of Gatwick with a second parallel runway could increase peak-hour capacity from 50 to 98 movements per hour and 560 000 aircraft movements per year. As the London market is one of the largest and strongest aviation markets in the world, the Gatwick capacity expansion option could trigger an incumbent, non-Oneworld UK carrier or a foreign network carrier to use the new capacity to establish a hub operation at Gatwick. This might be a traditional, stand-alone hub operation of an EU or US hub carrier, facilitated by the open skies agreement between the US and Europe. Another option is a Brussels-like scissor hub between Asia and the US based on 5th freedom traffic rights. We note that the peak capacity of 98 movements per hour would enable only a smaller scale hub operation. Such peak-hour capacity would enable Gatwick to theoretically have the same scale of hub operations as Copenhagen, Madrid, Rome or Heathrow today (Figure 5.4)

Figure 5.4. Peak-hour capacity versus number of connections via the hub per week in 2008³¹

Source: SEO Netscan; individual airport data

Home-based hub carrier and partners

BA and partners will continue their hub operations from Heathrow. The growing scarcity of capacity at Heathrow will increase the opportunity costs of slots and will result in a continuation of crowding out of short-haul and lower capacity/ low yield flights, higher airline economic rents and higher ticket prices. The focus of Heathrow will be increasingly on long haul, high capacity flights with a growing share of local OD traffic. BA and partners at Heathrow will face more competition in both the short and long haul network from the new hub operation at Gatwick, assuming that investments in surface access make Gatwick equally attractive to the business community.

Other legacy network and legacy point-to-point carriers: shift from Heathrow to Gatwick.

A non-Oneworld carrier establishes the hub operation at Gatwick. If this is a competing network carrier currently operating out of Heathrow, this could involve a shift of capacity from Heathrow to Gatwick, leaving more room for Oneworld carriers at Heathrow. The new hub carrier at Gatwick would most likely benefit from lower charges in comparison to the hub carrier at Heathrow. On the other hand, yields at Gatwick are lower than at Heathrow, which may put the competing hub carrier at a competitive disadvantage.

The legacy point-to-point segment at Gatwick is likely to continue and modestly grow its network, potentially cherry picking on the transfer demand of the new hub operation. As inbound long-haul traffic is expected increase relative to outbound traffic with growth in leisure demand from Asia, Gatwick may become the preferred platform for network growth for certain Asian carriers – a tendency that would be reinforced by the increasing scarcity of capacity at Heathrow.

Low-cost and leisure carriers continue to operate out of Gatwick.

Low-cost and leisure carriers will continue to operate out of Gatwick and benefit from the increase in capacity, in particular if the increases in airport charges are modest, as currently expected. Over the

31 The hub connectivity at Frankfurt is exceptional because of its efficient connections and high share of the hub carrier in the total number of flights

longer term, when Gatwick again nears capacity limits and slot prices increase, low-cost carriers may search for alternatives for their network growth at Stansted and Luton.

Opportunity to develop Gatwick into a cargo marketplace.

Establishment of a hub operation at Gatwick including growth of long-haul services would provide the opportunity to develop Gatwick into a cargo marketplace alongside Heathrow. With the modest increase in charges, capacity expansion could provide opportunities for full-freighter operations as well.

Impact on connectivity and consumers

This scenario would result in a substantial increase in competition between British Airways (and partners) and the new hub operation at Gatwick, both in the local and the connecting markets, to the benefit of the consumer in London (local OD market), consumers in the rest of the UK (local and connecting market) and consumers outside the UK (connecting market). As in scenario 2, this scenario is suboptimal in connectivity terms: spreading two hub operations over two airports with essentially limited peak-hour capacity results in a lower number of connecting opportunities via the hubs, lower connecting traffic volumes and less airport connectivity than would be the case if peak-hour capacity growth were concentrated at a single location. However, the hub carrier at Gatwick may also add to the destination portfolio of London if it benefitted from the much lower visit costs at Gatwick, which may allow it to serve thinner European routes with smaller aircraft in a profitable way. On long-haul routes, it may search for markets currently not served by the hub carrier at Heathrow so as to avoid head-to-head competition.

Consumers in certain parts of London will benefit from connectivity growth closer to their home and work locations. A careful analysis would be needed to answer the question if decreases in access costs would compensate for the suboptimal connectivity gains for London as a whole in comparison to scenario 1.

In the longer run, competition could also result in low profitability for both hub operations. It may even force the hub airlines to reposition their networks, for example by de-hubbing Gatwick, with adverse effects on the connectivity available to the UK consumer.

Crowding-out effects at Heathrow and Gatwick.

The development of Gatwick into a competing hub will require the carrier(s) involved to acquire a substantial amount of slots through the regular slot allocation procedure as well as through the secondary slot market or by taking-over other airlines holding slots at Gatwick. It is assumed that current lower-yield operations (low-cost and leisure) at Gatwick are gradually crowded out to Stansted and Luton in the long-run. If the new hub carrier operation at Gatwick involves carriers currently operating at Heathrow, some capacity may become available at Heathrow, which is likely to be acquired by the incumbent hub carrier and other legacy carriers. In the long-run however, as capacity shortages remain at Heathrow, the focus at Heathrow will be increasingly on high capacity flights to large long-haul destinations with increasing shares of OD demand. Crowding-out may take place with respect to short haul flights at Heathrow in the long-run.

Figure 5.5. Summary of scenario 4: Hubs at Gatwick and Heathrow

↑ Increase in flights ↓ Decrease in flights	Heathrow	Gatwick	Other London Airports
Hub carrier and partners	↑ ↔	↑	↔
Other non-home-based network carriers	↑ ↔	↑	↔
Point-to-point legacy	↔	↑	↔
Low-cost	↓ ↔	↑ ↔	↑
Charter	↓ ↔	↑ ↔	↔
Cargo	↔	↑	↔

Airline response 5: Partnerships – Gatwick becomes a low-cost “gateway”, Heathrow remains the network hub.

This airline response envisions the partnering of legacy network carriers and/ or low-cost carriers (of which some start to operate in the long-haul market), to facilitate passenger connectivity. This could take place either through a new alliance/ codeshare formula or by an airport-led connect strategy³², where the airport takes care of baggage transfers and arranges a smooth interline transfers, including an insurance for passengers to catch a later flight in case of missed connections.

Low-cost and leisure carriers grow significantly at Gatwick, hub carrier and partners continue at Heathrow.

Low-cost grows significantly at Gatwick as part of this airline response. Low-cost carriers partner with each other and with full-service carriers, without adding too much complexity to their schedule. Long-haul low-cost is assumed to flourish at Gatwick given the large local OD market and strong growth in the inbound long-haul leisure market as well as the potential for low-cost and full-service feed. The hub carrier and partners at Heathrow develop along the lines of airline response 4, with over time further crowding out of short-haul and lower yield flights to Gatwick.

Non-home-based network carriers and legacy point-to-point carriers focus growth on Gatwick

Non-Oneworld long-haul carriers will increasingly focus network growth at Gatwick, benefiting from feed provided by low-cost carriers and availability of capacity. In particular network carriers from Asia benefit from brand loyalty in their own home market as inbound long-haul traffic is expected to grow faster than outbound traffic.

32 Such as Gatwick Connect, ViaMilano or iChangi Connect.

Growth of cargo at Gatwick.

As in airline response 4, the growth of long-haul connections at Gatwick facilitating belly-hold freight transport, potential development of full-freighter services and excellent surface accessibility may provide the opportunity to develop a role for Gatwick as a marketplace for cargo alongside Heathrow.

Impact on connectivity and consumers

The growth of low-cost carriers is assumed to result in significant increase in short-haul connectivity. Due to the nature of the low-cost business model, such a scenario will lead to suboptimal schedule design for transfer passengers, as low-cost carriers will try to avoid the complexity of a wave-system structure. Hence, the share of transfer traffic will remain limited, in the range of 10-20% maximum, and will not reach the levels of a typical hub airport. Long-haul growth takes place because of entry of non-home-based network carriers and long-haul, low-cost carriers, but the range and frequency of long-haul destinations will be more limited than in airline response 4. The strong presence of low-cost carriers may benefit both local and connecting passengers in terms of choice and ticket prices.

Impact on Heathrow and the other London airports.

Over time, as capacity shortages remain at Heathrow, the focus at Heathrow will be increasingly on high capacity flights to large long-haul destinations with increasing shares of OD demand. Crowding out will take place with respect to short-haul flights at Heathrow in the long-run. As capacity is available at Gatwick and charges are expected to rise only modestly, a relative shift of low-cost carrier growth from Stansted/ Luton to Gatwick can be expected.

Figure 5.6. **Summary of airline response 5: Partnerships – Gatwick becomes a low-cost “gateway”, Heathrow remains the network hub**

↑ Increase in flights ↓ Decrease in flights	Heathrow	Gatwick	Other London Airports
Hub carrier and partners	↑ ↔	↔	↔
Other non-home-based network carriers	↑ ↔	↑	↔
Point-to-point legacy	↓	↑	↔
Low-cost	↔	↑	↓ ↔
Charter	↔	↑	↔
Cargo	↔	↑	↔

Airline response 6: Gatwick point-to-point growth, Heathrow remains the network hub.

Growth of low-cost and charter carriers.

Instead of developing Gatwick into a low-cost gateway, where point-to-point traffic is mixed with connecting traffic, this response assumes that low-cost carriers take up most of the capacity at Gatwick but stick to a typical low-cost carrier business model without a deliberate strategy to stimulate connecting traffic and achieve additional route density and connectivity. The central assumption is that classic low-cost carrier business model focus on cost minimization, which excludes facilitating connecting traffic. The growth of these carriers at Gatwick comprises partly “autonomous growth” and partly migration of flights from Stansted and Luton to Gatwick. A number of low-cost, long-haul destinations are assumed to be developed, based on the large local market for leisure and visiting friends and relatives.

Hub carrier and partners, non-home-based network carriers and legacy point-to-point carriers.

Over time, an increasing share of the additional capacity at Gatwick will be used by carriers that currently operate at Heathrow but find more cost effective options at Gatwick when capacity becomes available. This may free-up some capacity at Heathrow, which can be used by the hub carrier and other network carriers. Over time, as capacity shortages remain at Heathrow, the focus at Heathrow will increasingly be on high-capacity flights to large long-haul destinations with increasing shares of OD demand. Crowding out will take place with respect to short-haul flights at Heathrow in the long run. Non-home-based network carriers and point-to-point legacy airlines such as Virgin Atlantic can be expected to use Gatwick increasingly, resulting in more full-service short and long-haul flights at Gatwick.

Modest cargo growth at Gatwick.

Capacity growth at Gatwick provides opportunities for dedicated full-freighter service at Gatwick. As long-haul passenger flight development is limited, however, and low-cost carriers avoid the complexities of handling belly-hold cargo, the development of Gatwick as a marketplace for cargo is modest in comparison to airline response 4.

Impact on connectivity and consumers and impact on Heathrow and the other London airports.

Short-haul connectivity at Gatwick will rise substantially at Gatwick. Average fares will go down as a result of both lower scarcity rents and more competition in the local OD market, to the benefit of the consumer. Long-haul connectivity at Gatwick only grows as far as long-haul, low-cost carriers are able to set up operations and legacy carriers prefer Gatwick over Heathrow when capacity shortages at Heathrow remain/ worsen. It remains to be seen to what extent the gain in short-haul connectivity is a net gain for the London airport system or just a redistribution of supply within the airports system, at the expense of Stansted and Luton.

Figure 5.7. Summary of airline response 6: Gatwick point-to-point growth, Heathrow remains the network hub.

↑ Increase in flights ↓ Decrease in flights	Heathrow	Gatwick	Other London Airports
Hub carrier and partners	↑ ↔	↔	↔
Other non-home-based network carriers	↑ ↔	↑ ↔	↔
Point-to-point legacy	↓	↑	↔
Low-cost	↔	↑	↓ ↔
Charter	↔	↑	↔
Cargo	↔	↑ ↔	↔

5.5 Evaluating the competitive outcome of the options

The central question to be answered in this study is how airline responses following expansion of either Heathrow or Gatwick are expected to determine the “competitive outcome” of runway capacity expansion in the London airport system. The factors of most interest in the “competitive outcome” are set out in the Airports Commission’s Appraisal Framework³³. In this study we give a qualitative analysis of the “competitive outcome” along the following lines:

- Impacts on connectivity: how does each of the options facilitate connectivity and what kinds of connectivity will be enhanced against the background of maintaining the UK’s status as Europe’s most important hub for aviation.
- Impacts on competition to the benefit of the aviation user: the UK aviation sector provides individuals and businesses with a wide choice of travelling options. Increasing competition within the sector has delivered significant benefits for users of aviation (business and leisure passengers and the freight sector) and the broader economy through making air travel more affordable and accessible. Hence, how does each of the options under consideration maximize the benefits of competition, both between airports and airlines, and lead to improvements in consumer welfare?
- Impact on airline economic rents: when demand exceeds supply at congested airports such as Heathrow and Gatwick, passengers pay a premium on their ticket price (Starkie 1998, p.112). Reduction of excess demand by supplying more airport capacity will lead to a transfer of these economic rents from the airlines to the users of aviation through lower ticket prices.

Before describing the impacts for these three items, we first discuss in more detail how we define connectivity, competition and benefits to aviation users due to the reduction of excess demand in the following sections.

33 Airports Commission (2014). Airports Commission: Appraisal Framework, pp. 27-32.

What is connectivity?

Connectivity growth is widely acknowledged to result in direct consumer welfare gains and deliver wider (external) economic effects. Although its economic importance is clear, its definition ranges widely.

We define connectivity as the extent to which consumers can reach their desired destination at minimum time and monetary costs. This means that connectivity is not only about the availability of destinations to and from London, but also about variables such as frequency, transfer times, in-flight times, ticket prices, reliability and access times.

Connectivity is a multidimensional concept.

Connectivity is a multidimensional concept. Connectivity starts with the availability of a flight connection to the desired destination. This does not only include directly served, non-stop destinations, but also any indirect travel opportunities via intermediate hub airports; the more destinations, the better the connectivity. Indirect connections are generally perceived as being of lower quality than direct connections, as they involve longer in-flight times (detours) and transfer time at the intermediate hub airport. In particular business passengers, with on average higher values of time, dislike indirect connections when direct flights are available. Hence, short air travel times mean good connectivity, all other things being equal. In addition, connectivity can be provided out of multiple airports serving the same geographical region.

The higher the daily frequency of the connection, the more flexibility a consumer has to choose the desired time for departure and arrival. The shorter the time between the actual and desired time of departure/ arrival – called the interval time or schedule delay – the better connected a city is. Again, in particular for the time sensitive passengers, the frequency variable is important.

Finally, access time is important. Connections at a large distance from the base location (office, home) are of less value to the consumer than the ones close by. Ultimately, connectivity is about the passenger experience of door-to-door travel times.

Competition.

It is not only availability and the characteristics of the connection that are important to connectivity but also about the price of the connection. Less time-sensitive passengers may be prepared to accept longer travel times (or in other words, lower quality connectivity) for a lower airfare. This explains partly the success of low-cost carriers, which are able to expand their local OD market with low fares. The other way around, time-sensitive business passenger may choose a better connection and pay a higher fare.

Hence, connectivity is not only about the availability and quality of connections in all dimensions but also about the costs of using the connection and how consumers perceive the availability and affordability of connections. Here, competition comes in, as competitive markets tend to have lower ticket prices than markets with one airline, all other things being equal. Furthermore, in particular entry of a low-cost carrier in markets where legacy carriers operate has a strong downward pressure on air fares.

Both variables and the interplay between them determine the utility of a certain connection for the consumer. Improvements in one of the dimensions of connectivity may result in consumer welfare gains and eventually have wider economic effects at the national level.

In sum, connectivity is a multidimensional concept. Connectivity is not only about the availability of a connection, the time involved and the frequency of connections, but also about the costs involved for the passenger and the extent to which passengers value the time and monetary costs of using that particular connection.

Diminishing returns to connectivity improvements.

Connectivity growth in a single air transport market is characterised by diminishing economic returns. A once-a-day flight to a new destination that is currently not, or very poorly, served (for example with a double transfer connection) with a lot of underlying passenger demand will result in substantial direct consumer welfare gains and possibly wider economic effects. In case different carriers already serve the same destination three times a day, the same additional daily flight will have significantly less economic value. It is like adding a 10th shoe shop in the main street if they all sell the same range of products. The same holds true if many indirect and efficient travel opportunities already exist in the same market.

These diminishing returns of connectivity growth do not only apply at the individual market level, but also to the airport and city level. Airlines develop their route networks in line with market demand. This means that economic centres with a lot of local demand tend to be already well served. Additional destinations added from/ to already well-connected destinations tend to generate lower economic returns than the ones already served from/ to the airports in the metropolitan area.

Hubs enhance connectivity.

Airline hub operations add transfer traffic to local OD demand in order to achieve the necessary route density to operate routes without sufficient local OD demand profitably and achieve network economies. The connections that hub carriers provide via the hub (so-called hub connectivity) and the connecting traffic that uses these hub connections are not a goal in themselves from a wider economic perspective, but a means to enhance the connectivity performance of the city served. As pointed out in this study, London faces the unique situation of having the largest OD market in the world, which reduces the need for transfer traffic at its hub airport compared to ‘classic’ hubs such as Frankfurt and Amsterdam. This explains its impressive connectivity performance without a fully-fledged hub operation.

Measuring connectivity.

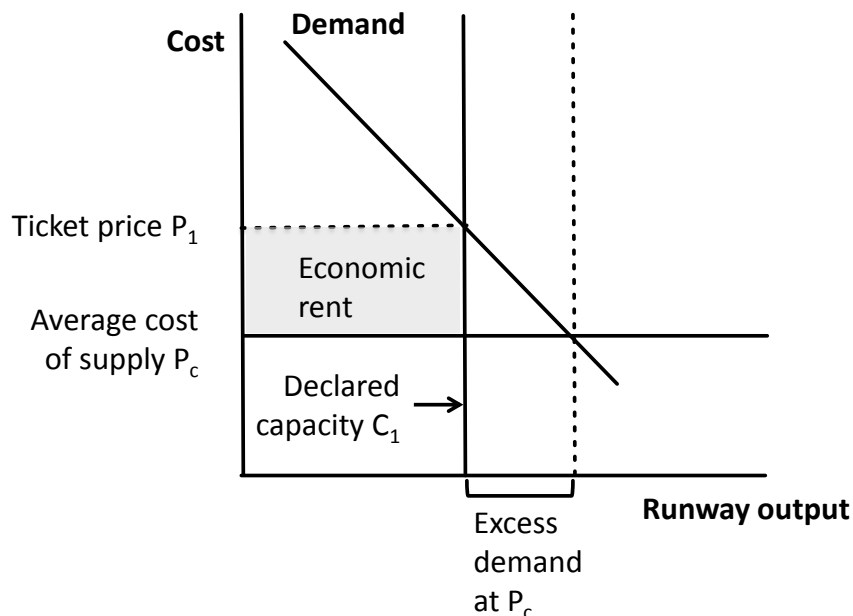
Many indicators are available to measure connectivity (for an overview see Burghouwt & Redondi 2014; Airports Commission 2013c). Yet, it is difficult to capture the multidimensional character of connectivity with one single measure. Probably closest come those measures that calculate direct consumer welfare gains as a result of improvements in certain dimensions of connectivity, such as more competition/ lower fares, shorter travel times, higher frequencies and more direct instead of indirect flights. Such measures are also able to take into account the value consumers attach to the time aspects of their journey and integrate existing demand and demand generation into the welfare calculation³⁴. For an overview see Burghouwt et al. (2007) and Veldhuis (2013).

34 We note that such measures take into account direct welfare impacts for consumers but not any additional wider (external) economic effects.

Benefits for aviation users from a reduction in excess demand.

If demand for airport capacity is larger than supply and prices for using that capacity for airlines are lower than the market clearing price, excess capacity produces an economic rent. This is the ‘potential for earning a return in excess of the average cost of supplying runway service’ (Starkie 1998, p.112). These excess returns cannot be captured entirely by airports such as Heathrow and Gatwick under the current regulatory framework as their prices are capped. The airlines, however, will charge the passengers what the market can bear in matching demand with available seats and hence, the airlines capture the economic rent, as Figure 5.8 shows. The extent to which ticket prices are higher than marginal costs at capacity-constrained airports will depend on the level of excess demand and competition from other airports in the catchment area that provide realistic alternatives to the passenger.

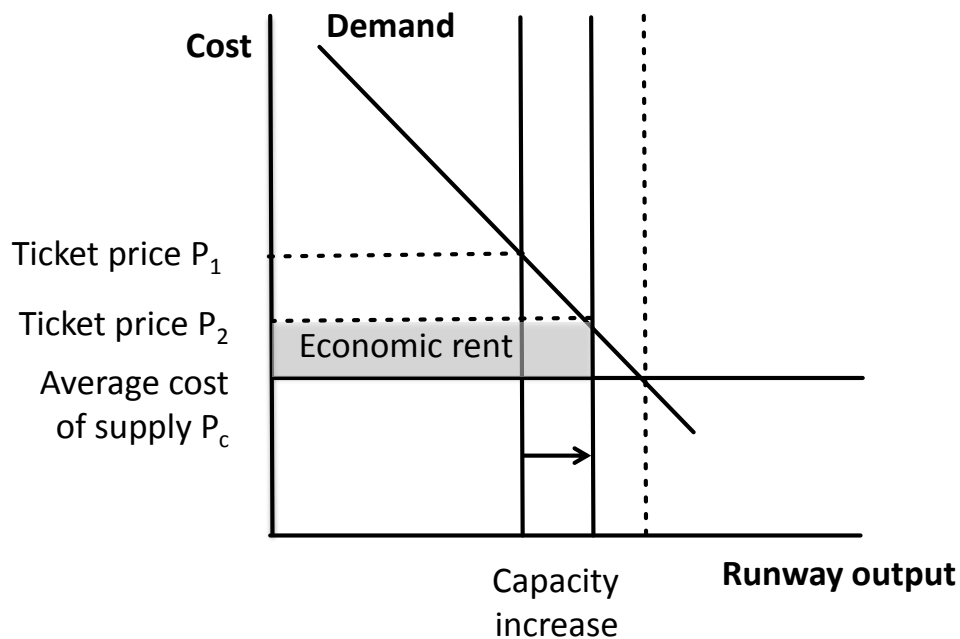
Figure 5.8. Excess demand increases ticket prices



Source: adapted from Starkie (1998).

When capacity is added to either Heathrow or Gatwick, new airlines will enter the market and add new routes. Because of the increased contestability of the market, ticket prices will fall, reducing the economic rent for the airlines to the benefit of the consumer (Figure 5.9). Benefits in terms of ticket prices are likely to be highest when capacity is expanded at the airport with the largest excess demand. If airport charges rise as a result of capacity expansion, the average cost of supply will rise, further reducing the economic rents accruing to airlines.

Figure 5.9. Reduction of excess demand decreases ticket prices



Source: adapted from Starkie (1998)

Impact on the competitive outcome.

About the impact assessment.

In the remainder of this chapter, we assess qualitatively the impact of the airline responses in the various scenarios on the main dimensions of connectivity: benefits of increased competition for consumers in the form of lower fares and improved availability of connections (more destinations, higher frequencies, shorter travel times). At this stage of the analysis, we indicate the expected direction of the effects, but not their magnitude.

Impacts on connectivity.

Benefits in terms of connectivity gains in the short-haul and long-haul markets are expected to be largest in airline response 1- where substantial growth of the hub operation takes place at a single location - as the route density achieved by an expanded hub operation will facilitate serving an increasing number of markets, both short-and long-haul, directly (Figure 5.10). This not only benefits the local London consumers but also other UK consumers as they are provided with increased connectivity via a transfer at Heathrow. Because of higher airport charges at expanded Gatwick or Heathrow, coverage of the European feeder market may remain limited, and restricted to the larger European markets.

The strong network at Heathrow may come to the detriment of long-haul direct flights to other UK cities. Short-haul connectivity is likely to grow in any of the scenarios, as other UK airports will benefit from increased connectivity with one or more of the London airports. Connectivity available for cargo will grow as a result of the increase in long-haul flights at Heathrow. As the hub carrier moves part of its flights back to Heathrow, Gatwick's full-service connectivity may partly be substituted with low-cost services and connections offered by legacy point-to-point carriers.

Airline responses 2 and 4 basically produce the same type of effects, but to a lesser extent as two hub operations side by side generate less connectivity than one large hub operation. On the other hand, the strong presence and modest growth of low-cost/ leisure carriers at Gatwick in airline response 4 is likely to offer more choice, competition and lower fares to the market, in comparison to airline responses 1 and 2.

In the case of a low-cost hub/ gateway at Gatwick (airline response 5) as well as point-to-point growth at Heathrow and Gatwick (airline response 3), short-haul connectivity will increase and to a lesser extent long-haul connectivity, depending on the success of long-haul, low-cost business models and the partnering of low-cost and network carriers under airline response 5. In case the role of Gatwick becomes an expanded point-to-point airport (airline responses 5 and 6), connectivity gains would primarily be realized in the short-haul market under current market conditions. The growth in low-cost offer in airline responses 3, 5 and 6 is likely to have positive impacts on competition levels and thus result in lower airfares for consumers.

Figure 5.10. Impact on competitive outcome

		Heathrow option			Gatwick option		
		Scenario 1 Hub carrier growth at Heathrow, point-to-point growth at Gatwick	Scenario 2 Two hub operations at Heathrow, point-to-point growth at Gatwick	Scenario 3 Point-to-point growth at Gatwick and Heathrow; Heathrow remains network hub	Scenario 4 Hub operation at Heathrow, competing hub operation at Gatwick	Scenario 5 Partnerships – Gatwick low-cost “gateway”, Heathrow network hub	Scenario 6 Gatwick point-to-point growth, Heathrow remains the network hub
Connectivity London airport system		Long-haul	↑	↑	↑ ↔	↑ ↔	↑ ↔
		Short-haul	↑	↑	↑	↑	↑
		Cargo	↑	↑	↑	↑	↔
Connectivity rest of UK		Long-haul direct	↓	↓	↔	↔	↔
		Long-haul indirect	↑	↑	↑	↑	↑
		Short-haul	↑	↑	↑	↑	↑
Competition benefits		Business local	↓	↑ ↔	↑	↑	↑
		Business transfer	↑	↑	↔	↑	↔
		Leisure/VFR local	↔	↑	↑	↑	↑
		Leisure/ VFR trf	↑	↑	↔	↑	↑
		Cargo users	↑	↑	↑	↑	↔
Transfer of scarcity rents from airlines to users (less excess demand, lower fares)		↑ ↑	↑ ↑	↑ ↑	↑	↑	

Benefits of competition for passengers and other aviation users.

Airline response 1 will lead to a more dominant position of the hub carrier and partners at Heathrow, but with improved connectivity. For leisure passengers, who are less time-sensitive, realistic direct and indirect substitutes are available. Transfer passengers will benefit from the larger hub operation at Heathrow in airline response 1 in the long-haul market, as the new connections provided via Heathrow will increase competition with existing connections via other EU and non-EU hubs in the market. In particular the price elastic leisure passenger will benefit from increased competition in the connecting market.

For other airline responses (2 to 6), the hub carrier within the London airport system is likely to become less dominant. As mainly low-cost carriers are expected to benefit in scenarios 3, 5 and 6, we expect a substantial downward pressure on fares, enhancing consumer welfare. In particular the growth of long-haul, low-cost in combination with growth of short-haul, low-cost at Gatwick under airline response 5 will result in increased competition to the benefit of the local consumer. As the connectivity gains are less pronounced compared to scenario 1, consumers elsewhere in the UK will not benefit from the same rise in indirect travel options through the London airports as an alternative to already existing indirect travel options.

Reduction of airline economic rents to the benefit of aviation users.

A major benefit of expanding airport capacity is the reduction of excess demand. Reduction in excess demand will result in a transfer of economic rents from airlines to passengers with downward pressure on fares (section 5.5) As excess demand is larger at Heathrow than at Gatwick, these consumer welfare gains will be larger for expansion at Heathrow (airline responses 1-3) than for expansion at Gatwick (airline responses 4-6).

5.6 Key conclusions regarding airline responses and competitive outcome

- Based on an analysis of the London airports system, key drivers for airline behaviour and the options for capacity expansion at either Gatwick or Heathrow, we have developed 6 different airline responses. The airline responses have a varying impact on the traffic structure in the London airport system as well as on competitive outcomes.
- Connectivity is expected to improve most when the hub carrier at Heathrow uses new capacity to reinforce its hub system, as the possibility to generate long-haul route density on top of local OD demand is largest. Multiple (competing) hub operations within the London airport system will also stimulate connectivity but to a smaller extent, as the connectivity gain of one large hub operation is larger than the sum of two smaller hub operations, because of the multiplier-effect of hub-and-spoke networks. However, a high increase in charges might prevent the hub carrier at Heathrow developing a hub operation with the same extensive feeder network as for example at Frankfurt or Amsterdam, potentially in contrast to a hub operation at Gatwick if charges at Gatwick prove lower than at Heathrow (airline response 4). It remains to be seen to what extent hub expansion at Heathrow will result in more capacity on existing routes as opposed to adding new routes.
- An airline response where network carriers and/ or low-cost carriers partner to facilitate connectivity may increase connectivity as well (airline response 5), but this gain will be limited based on current airline business models. However, this may change as airline business models evolve further.

- Not expanding Heathrow is likely to result in further crowding out of short-haul/ lower yield flights at Heathrow as excess demand increases, as well as a further rise in air fares. Over time, short-haul/ lower yield flights are substituted with long haul, high capacity flights. The role of Gatwick, Stansted, Luton and City for short-haul connectivity will increase.
- Differences in terms of gains in short-haul connectivity for the London airports system are likely to be much smaller for the different airline responses, as the relevance of connecting traffic to operating high frequency routes profitably is smaller and the market for short-haul routes is much larger³⁵. We note that the expected increase in charges after expanding Heathrow may come at the detriment of high frequency, low capacity feeder services to secondary and tertiary cities in the UK and elsewhere in Europe.
- In terms of reduction of scarcity rents and connectivity gains, a UK consumer is likely to gain most by expanding Heathrow. With severe capacity constraints and high yield demand, the scarcity rents can be expected to be largest there. Hence, reduction of excess demand following Heathrow expansion is likely to reduce fares more than following Gatwick expansion. Furthermore, connectivity gains are likely to be highest for Heathrow expansion and growth of the hub carrier.
- Expansion of Gatwick is likely to have the strongest positive impacts on competition, with benefits to the consumer due to the expected increase in low-cost carrier competition and a less dominant position of a single alliance, resulting in more choice for the consumer and lower fares.
- However, it is not clear what the overall impact will be on consumer welfare of changing scarcity rents, connectivity growth and changes in competition level as a result of expanding either Gatwick or Heathrow.

35 80% of passenger traffic at EU airports concerns intra-EU destinations.

6. Likelihood of airline responses

The way macroeconomic conditions develop over the long term will affect the likelihood of the airline responses examined unfolding. Some of the responses are unlikely under some scenarios. Airline business models evolve, macro-economic conditions change, new aircraft technology will be on the market when new capacity becomes available. Overall, hub carrier growth in case of Heathrow expansion and the development of Gatwick into a low-cost gateway are the most likely airline responses under the various macroeconomic scenarios developed by the Airports Commission.

6.1 Introduction

The airline responses presented in the previous chapter are based on a business-as-usual assumption regarding macro-economic development as well as the structure of the airline industry and airline business models. As stated in the introduction to chapter 4, the airline industry is highly dynamic and its performance is closely related to macro-economic, technological and aero-political conditions. Hence, the question is to what extent the airline responses developed in chapter 4 are robust in relation to potential long-term changes inside and outside the industry.

In this chapter, we will address the likelihood of the different airline response scenarios by confronting them with the five macroeconomic sensitivity scenarios developed by the Airports Commission (Airports Commission 2013).

6.2 The Airports Commission forecast and scenarios

Baseline forecast.

In its Interim Report (Airports Commission 2013), the Commission reported its forecast for aviation demand in the UK in 2050. Its unconstrained forecast yielded a median of 450 million terminal passengers in 2050, in a range of 380-550 million passengers per annum. Based on this baseline forecast, the Commission concluded that in 2040 all London and South East airports will be full, even with a carbon cap in place, and that 90% of the available capacity in London and the South East will be used by 2030. Based on these demand forecasts, the Commission points to the need for one additional runway in the South East by 2030 across a range of scenarios. The Commission also indicated that it is likely that there will be a need for a second additional runway by 2050.

Scenarios.

The future of the aviation industry is difficult to predict. To ensure that its forecast sufficiently takes into account uncertainties in the market, the Commission developed alternative scenarios for the future of the aviation sector, besides the baseline/ assessment of need scenario. Each scenario has different implications for the respective market shares of hub-and-spoke and point-to-point networks and for the participation of UK airports in global route networks. The Commission uses the following four, qualitative scenarios to compare with its baseline forecast (Airports Commission 2013).

Assessment of need scenario.

This baseline scenario is consistent with the forecasts underpinning the Commission's assessment of need. In this scenario, future demand is primarily determined in relation to past trends and central data projections (for example, on GDP, global oil prices etc.).

B. Global growth.

This scenario is characterised by strong economic growth and increasing globalisation of the economy. The role of major aviation hubs and alliances around the world is strengthened. Liberalisation of aviation markets continues. Continued growth of the middle class leads to strong demand growth and strengthening of Middle East carriers. Global airline alliances further strengthen the global hub network, benefiting from a new generation of fuel-efficient aircraft.

C. Relative decline of Europe.

This scenario also shows strong economic growth and increasing globalisation. However, it assumes aggressive competition between the legacy carriers and new market entrants from emerging economies. This results in a decline in the importance of the European aviation hubs as European airlines are frequently out-competed by Middle Eastern and Asian carriers. Middle Eastern carriers use new aircraft technology to by-pass the major European hubs and fly directly into secondary European cities. The role of global alliances declines.

D. Low cost is king.

Scenario C assumes a growing role for low-cost carriers as they enter long-haul markets and self-connecting becomes more common for passengers. By 2040, charter and low-cost carriers take 50% of the market. The importance of hubs and network carriers declines throughout the world. Liberalization of aviation markets worldwide continues. Low-cost carriers use new aircraft technology such as Boeing 787 and Airbus A350 to enter long-haul point-to-point markets. The low-cost carriers have little incentive to enter into formal alliances.

E. Global fragmentation.

Scenario D assumes a decline in global economic and aviation growth. The world economy fragments and liberalisation stalls. Countries turn inward, adopting protectionist and interventionist policies. Global aviation markets suffer from protectionism and a slowdown of growth in Asia. Airlines compete aggressively for a relatively small pool of passengers, resulting in a partial break-up of alliances. New long-range aircraft enable more markets to be served point-to-point.

6.3 Likelihood of the airline responses

We have confronted the airline responses with the qualitative scenarios of the Airports Commission (A-E) as they described above. Regarding the robustness/ likelihood of the airline responses, we can draw the following conclusions.

Airline response 1: Hub carrier growth at Heathrow, point-to-point growth at Gatwick.

- Assessment of Need (A): Continuing importance of alliances and hubs as well as traffic growth makes hub capacity in particular in demand in the Assessment of Need scenario. New aircraft

technology is used to enhance hub performance. Hence, the likelihood of the expected airline responses is high.

- **Global Growth (B):** Continuing importance of alliances and hubs as well as traffic growth makes hub capacity in particular in demand in the Global Growth scenario. New aircraft technology is used to enhance hub performance. Hence, the likelihood of the expected airline responses is high.
- **Relative Decline of Europe (C):** Aggressive hub competition from outside Europe leads to a relative decline of the Heathrow hub in the international-to-international connecting market. The share of hub carrier at Heathrow will be smaller. In that case, it might be less likely that the hub carrier is able to build up a hub operation at the envisioned scale. The likelihood of the airline response is moderate.
- **Low-cost is King (D):** Strong low-cost growth cannibalizes the short-haul but also the long-haul market. The hub model is under pressure. The hub operation at Heathrow will not reach its envisioned scale. Gatwick grows as far as capacity permits as a point-to-point airport, including long haul low-cost. The likelihood of the airline response scenario is moderate to small.
- **Global Fragmentation (E):** As the market is in decline, single hub operations become more important to connect small markets with an intermediate transfer. A less liberal aviation market restricts the further growth of the low-cost sector. If global fragmentation was severe enough to result in the demise of the hub carrier, this airline response is not plausible. Otherwise the likelihood of the airline response under this scenario is moderate to high.

Airline response 2: Two hub operations at Heathrow, point-to-point growth at Gatwick.

- **Assessment of Need (A):** Network carriers and alliances remain important, besides a large share of low-cost carriers in the short-haul market. Lower economic growth than under the Global Growth scenario (B) makes a second hub operation in competition with BA and partners less likely. Hence, the likelihood of the expected airline responses is somewhat less than moderate.
- **Global Growth (B):** Benefiting from strong market growth and global open skies, a competing alliance establishes a second hub operation at Heathrow. The question is to what extent a second hub operation will be viable in the long run, given the fierce competition at the home base and the incumbent's advantages. From a financial point of view, building a competing hub operation at Heathrow will be a risky undertaking. The likelihood of the airline response in this scenario is moderate.
- **Relative Decline of Europe (C):** Growing competition from Far East and Middle East carriers will result in a less liberal approach from EU governments towards these carriers. Hence, it is unlikely that a non-EU carrier will establish a hub operation at Heathrow in this scenario. As the European hub model itself is under pressure from increased competition in the both the short-haul and long haul market, establishing a second hub in London is not likely. The likelihood of the airline response in this scenario is low.
- **Low-cost is King (D):** Strong low-cost growth cannibalizes the short-haul but also the long-haul market. The hub model is under pressure. Competing hub carriers retreat at their primary hubs. The likelihood of the envisioned airline response in this scenario is low.

- Global Fragmentation (E): Hub carriers rationalize their networks and focus on their primary hubs; secondary hubs are dismantled. Airport capacity for an additional secondary hub operation at Heathrow is not in demand. The likelihood of the envisioned airline response under this scenario is low.

Airline response 3: Point-to-point growth at Heathrow and Gatwick, Heathrow remains network hub.

- Assessment of Need (A): Network carriers and alliances remain important, besides a large share of low-cost carriers in the short-haul market. The current trend in the market continues and low-cost carriers increasingly search for new market opportunities and premium demand. As part of their evolving business model, they may start operating some services out of Heathrow. Yet, their market share remains limited, partly because of the high aero-charges. The likelihood of the airline response in this scenario is moderate.
- Global Growth (B): On-going liberalization, demand growth and new aircraft may facilitate operations of low-cost at Heathrow both on long-haul and short-haul. Low-cost carriers benefit from new aircraft technology. Yet, network carriers remain very strong players at Heathrow in this scenario. Hence, the operations of low-cost carriers at Heathrow will not increase to any large extent. The likelihood of the airline response in this scenario is low.
- Relative Decline of Europe (C): As the European hub carrier model is under pressure from increased competition, low-cost carriers start to play a more important role in connecting London with the rest of Europe through point-to-point connections in short-haul and selected long-haul markets. Long-haul growth is supported by high growth figures in the Asian inbound (leisure) market. Yet, Heathrow remains expensive for low-cost carriers to operate from. The likelihood of the airline response in this scenario is moderate to high.
- Low-cost is King (D): Low-cost carriers search for new opportunities as the European market is saturating. One of their strategies is to target the premium passenger by entering the primary airports such as Heathrow as well as the long-haul market. They benefit from new aircraft technology and further liberalization. The hub model is under pressure, which makes large-scale hub capacity less in demand. The likelihood of the airline response under this scenario is high.
- Global Fragmentation (E): as the economy, aviation demand growth and liberalization stall, point-to-point carriers may want to avoid operating out Heathrow with its high aerocharges and high competition levels. Instead, they target the price sensitive passenger out of Gatwick, Stansted and Luton and focus on markets with fewer competitors. The likelihood of the airline response in this scenario is low, assuming that the hub carrier survives.

Airline response 4: Hub operation at Heathrow and competing hub operation at Gatwick.

- Assessment of Need (A): Network carriers and alliances remain important, besides a large share of low-cost carriers in the short-haul market. Lower economic growth than under the Global Growth scenario (B) makes a second hub operation in competition with BA and partners less likely. Hence, the likelihood of the expected airline response is moderate.

- Global Growth (B): Continuing importance of alliances and hubs and traffic growth makes hub capacity in particular in demand, including for a secondary hub operation at Gatwick. The likelihood of the airline response in this scenario is high.
- Relative Decline of Europe (C): Growing competition from Far East and Middle East carriers results in a less liberal approach from EU governments towards these carriers. Hence, it is unlikely that a non-EU carrier will establish a hub operation at Gatwick in this scenario. The likelihood of the airline response in this scenario is low.
- Low-cost is king (D): Strong low-cost growth cannibalizes the short-haul but also the long-haul market. The hub model is under pressure. Competing hub carriers retreat at their primary hubs. The likelihood of the envisioned airline response in this scenario is low.
- Global fragmentation (E): Hub carriers rationalize their networks and focus on their primary hubs; secondary hubs are dismantled. Airport capacity for an additional secondary hub operation at Gatwick is not in demand. The likelihood of the envisioned airline response under this scenario is low.

Airline response 5: Partnerships – Gatwick becomes a low-cost gateway, Heathrow remains the network hub.

- Assessment of Need (A): On-going liberalization, demand growth and new aircraft facilitate further growth of low-cost at Gatwick both in long-haul and short-haul, local and (self) connecting market. Low-cost carriers benefit from new aircraft technology. The likelihood of the airline response in this scenario is high.
- Global Growth (B): As in the Assessment of Need scenario (A), on-going liberalization, demand growth and new aircraft facilitate strong growth of low-cost at Gatwick both in long-haul and short-haul, local and (self) connecting market. Low-cost carriers benefit from new aircraft technology. The likelihood of the airline response in this scenario is high.
- Relative Decline of Europe (C): Middle East and Far East carriers partner with short- and long-haul low-cost carrier to create connectivity at Gatwick. Low-cost carriers benefit from new aircraft technology. The European hub model is under pressure. The likelihood of the airline response under this scenario is high.
- Low-cost is King (D): Low-cost carriers and full-service carriers at Gatwick partner together (and with the airport) to facilitate connections, both on the short-haul and long haul market. They benefit from new aircraft technology and further liberalization. The hub model is under pressure, which makes large-scale hub capacity less in demand. The likelihood of the airline response under this scenario is high.
- Global Fragmentation (E): In adverse economic conditions passengers are very price sensitive; self-connect traffic is on the rise even on short-haul routes. However, low-cost growth is restricted by restrictive aero-political policies. Demand for long-haul low-cost is modest as globalization stalls. The likelihood of the airline response in this scenario is moderate.

Airline response 6: Gatwick point-to-point growth, Heathrow remains the network hub.

- Assessment of Need (A): Low-cost carriers continue growth at the Gatwick location. As Heathrow remains capacity restricted, legacy point-to-point carriers and lower yield network carriers focus growth on Gatwick. In order for low-cost carriers to grow further in a maturing market, they will need to adapt their business models. The question is if this can be done without targeting the (self) connecting market or the premium passenger market at Heathrow. The likelihood of the airline response in this scenario is moderate.
- Global Growth (B): Strong alliances and network carriers may try to get a strong foothold at Gatwick in order to create room for growth. Independent low-cost growth at Gatwick is modest. Yet, the hub carrier may set up a subsidiary to compete out of Gatwick. Hence, the likelihood of the airline response in this scenario is moderate.
- Relative Decline of Europe (C): As the European hub carrier model is under pressure from increased competition, low-cost carriers start to play a more important role in connecting London with the rest of Europe through point-to-point connections in short-haul and selected long-haul markets. Long-haul growth is supported by high growth figures in the Asian (leisure) market. The likelihood of the airline response in this scenario is high.
- Low-cost is King (D): In order for low-cost carriers to grow further in a maturing market, they will need to adapt their business models. The question is if this can be done without targeting the (self) connecting market. The likelihood of the airline response in this this scenario is moderate.
- Global Fragmentation (E): Low-cost hubbing/ self-connecting traffic does not take off. There is little demand from network carriers to use Gatwick for hubbing activities as they retreat to their primary hubs. Gatwick retains short-haul point-to-point services with limited long-haul traffic. The likelihood of the airline response in this scenario is high.

6.4 Key conclusions regarding the likelihood of the airline responses.

A variety of airline responses can be envisioned for different futures of the aviation industry as a whole. However, not all airline responses are realistic for each of the future scenarios developed by the Commission (see figure):

- In the Assessment of Need scenario (A) or ‘business-as-usual scenario’, hub carrier growth following Heathrow expansion and Gatwick as a point-to-point gateway following Gatwick expansion seem to be most realistic airline responses, although there is a moderate likelihood of the other responses as well.
- In the Global Growth scenario (B), most airline responses are likely except for an expanded Heathrow with predominantly pure point-to-point, low-cost growth. Strong network carriers may have a substantial interest in an expanded Gatwick in a high growth market, given the capacity shortages at Heathrow. The multi-hub airline responses (2 and 4) seem only to be realistic in case of Global Growth.
- In the Relative Decline of Europe scenario (C), no multi-hub airline response is likely as the political will to accommodate hub operations from Middle East or Far East carriers will diminish as these carriers gain market share and put pressure on the European carriers. We expect the hub

carrier British Airways to focus on protecting its position at Heathrow as much as possible if Heathrow is expanded but strong, non-European hub carriers will cannibalize its market. Connections via non-EU hubs are likely to increase. In case of expansion of Gatwick, Middle East and Asian carriers may team up with European low-cost carriers to organize feed for their long-haul flights.

- The Low Cost is King scenario (D) is likely to rule out multi-hub airline responses (2 and 4). In case of expansion of Heathrow, low-cost entry at Heathrow is likely. In case of expansion of Gatwick, a hybrid hub operation could be one of the realistic futures, in which low-cost and legacy airlines partner to provide connectivity.
- The Global Fragmentation scenario (E) will most likely result in hub carriers rationalizing their networks and focusing on their primary hubs. As the market stalls, the hub carrier may not be able to develop its hub network to the full extent made possible by expansion of Heathrow. In the case of expansion of Gatwick, a point-to-point response is likely in this scenario.

Figure 6.1. Likelihood of the airline responses under different aviation scenarios as defined by the Airports Commission

	Heathrow Option			Gatwick Option		
	Response 1	Response 2	Response 3	Response 4	Response 5	Response 6
Scenarios:	Hub carrier growth at Heathrow, point-to-point growth at Gatwick.	Two hub operations at Heathrow, point-to-point growth at Gatwick.	Point-to-point growth at Heathrow and Gatwick, Heathrow remains network hub.	Hub operation at Heathrow and a competing hub operation at Gatwick.	Partnerships – Gatwick becomes a low-cost “gateway”, Heathrow remains the network hub.	Gatwick point-to-point growth, Heathrow remains the network hub.
A Assessment of Need	+	o	o	o	+	o
B Global Growth	+	o	–	+	+	o
C Relative Decline of Europe	o	–	o +	–	+	+
D Low-Cost is King	– o	–	+	–	+	o
E Global Fragmentation	o +	–	–	–	o	+
Overall likelihood of airline response across scenarios	+	–	– o	–	+	+

Key:

- + High likelihood
- o Moderate likelihood
- Low likelihood

Further quantification of the competitive effects of the airline responses.

Confronting the scenarios of the Airports Commission with the airline responses brings forward which combination of scenarios are useful, in terms of their likelihood, to be considered in further quantitative impact analysis to be carried out by the Airports Commission. The most realistic combinations of scenarios and airline responses are:

- Assessment of Need with airline responses 1 and 5
- Global Growth with airline responses scenarios 1, 4 and 5
- European Decline with airline responses 3, 5 and 6;
- Low-cost is King with airline responses 3 and 5;
- Global Fragmentation with airline responses 1 and 6.

Taking into account the overall likelihood of the airline responses in all scenarios, any further quantitative impact analysis may most usefully consider airline responses 1, 5 and 6.

We note that airline response 2 (two hubs at Heathrow) may involve too much financial risk for the new hub carrier and would not be realistic except possibly in the Global Growth scenario. The lower yields at Gatwick and suboptimal peak-hour capacity also make the establishment of a competing hub operation at Gatwick less likely (airline response 4).

Bibliography

- Airports Commission (2013). Airports Commission: interim report. December 2013.
- Airports Commission (2013b). Discussion paper 04: airport operational models. May 2013.
- Airports Commission (2014). Airports Commission: appraisal framework. April 2014.
- Burghouwt, G. (2014). Long-haul specialization patterns in European multihub networks: an exploratory analysis. *Journal of Air Transport Management* 34, 30-41.
- Burghouwt, G., J.G. de Wit and P. Mendes de Leon (2014). EU air transport liberalization: process, impacts and future considerations. Paper prepared for the ITF/ ATRS session on airline liberalization. Bordeaux, July 2014.
- Burghouwt, G., J. Veldhuis and R. Lieshout (2007). Estimation of the welfare impact of airline flight schedule changes with Netscan. Paper presented at the Air Transport Research Society Conference, 22-24 June 2007, University of Berkely.
- Bush, H. (2014). Intervening to promote connectivity: issues and challenges. Paper prepared for Airneth workshop ‘The public interest of network quality at Schiphol’.
- Copenhagen Economics (2012). Airport competition in Europe. Study commissioned by ACI Europe.
- Dobruszkes, F. (2013). The geography of European low-cost airline networks: a contemporary analysis. *Journal of Transport Geography* 28, 75-88.
- Francis, G., N. Dennis, S. Ison and I. Humpreys (2007). The transferability of the low-cost model to long-haul airline operations. *Tourism management* 28(2), 391-398.
- Grosche, T. and R. Klophaus (2013). Hubs at risk: exposure of Europe’s largest hubs to competition on transfer city-pairs. Paper presented at the 2013 Air Transport Research Society Conference, 26-29 June, Bergamo.
- Klophaus, R., R. Conrady and F. Fichert (2012). Low cost carriers going hybrid: evidence from Europe. *Journal of Air Transport Management* 23, 54-58.
- Koster, P., E. Kroes and E. Verhoef (2011). Travel time variability and airport accessibility. *Transportation Research B* 45, 1545-1559.
- Lieshout, R. and G. Burghouwt (2013). Airline competition in connecting markets. In: P. Forsyth et al. (eds). *Liberalization in aviation: competition, cooperation and public policy*, 73-90. Aldershot: Ashgate.

- Mason, K.J. and W.J. Morrison (2008). Towards a means of consistently comparing airline business models with an application to the “low cost” airline sector. *Research in transportation economics* 24(1), 75-84.
- Morrell, P. (2008). Van long-haul low-cost airlines be successful? *Research in Transportation Economics* 24(1), 61-67.
- Redondi, R., P. Malighetti and S. Paleari (2012). De-hubbing of airports and their recovery patterns. *Journal of Air Transport Management* 18(1), 1-4.
- Starkie, D. (2006). The dilemma of slot concentration at network hubs. IATA Economics paper. https://www.iata.org/whatwedo/Documents/economics/Starkie_Slot_Concentration.pdf
- Starkie, D. (1998). Allocating airport slots: a role for the market? *Journal of Air Transport Management* 4, 111-116.
- Starkie, D. (2012). European airports and airlines: evolving relationships and the regulatory implications. *Journal of Air Transport Management* 21, 40-49.
- Starkie, D. (2013). Why a small increase in airport charges might lead to a large passenger loss. *Airnet Fellow Column*.
- Veldhuis, J. (2013). Consumer benefits of air routes. Presentation at the GARS workshop on Effects of Air Transport on the Economy, 20 June 2013.
- Wensveen, J. and R. Leick (2009). The long-haul low-cost carrier: a unique business model? *Journal of Air Transport Management* 15(3), 127-133.
- Wojahn, O.W. (2001). Airline networks. PhD thesis.

Expanding Airport Capacity: Competition and Connectivity The case of Gatwick and Heathrow

The Airports Commission was set up by the Government of the United Kingdom in 2012 to take an independent look at the UK's future airport capacity needs. It has been tasked with setting out the nature, scale, and timing of steps needed to maintain the UK's status as an international hub for aviation, alongside recommendations for making better use of the UK's existing runway capacity by the end of 2013; and setting out recommendations on how to meet any need for additional airport capacity in the longer-term by the summer of 2015.

In December 2013 the Commission published its Interim Report, which included a shortlist of three options for increasing the UK's aviation capacity in the long term: two at Heathrow and one at Gatwick. To determine which alternative would provide the largest benefits to passengers, freight businesses and the UK economy overall it is important to understand how airlines are likely to respond to increased runway capacity.

This report examines the likely responses from airlines in all segments of the market: the local hub carrier, BA, other network airlines, short and long-haul low-cost carriers and charter airlines. It identifies the main drivers of airline behaviour and considers the possible influence of changes to existing business models and the introduction of new types of aircraft, such as the Boeing Dreamliner and Airbus A350. The report develops six sets of responses, three following expansion of Gatwick and three following expansion of Heathrow, to test the likely evolution of the market. As the future of the highly dynamic aviation market is uncertain, it checks the resilience of each across five different scenarios of how the global aviation sector may develop in the future. The analysis maps the implications for connectivity and potential benefits to the consumer through airline competition and relieving congestion at airports and reducing the associated economic rents.

This report is part of the International Transport Forum's Country-Specific Policy Analysis (CSPA) series. These are topical studies on specific transport policy issues of concern to a country carried out by ITF on request.

International Transport Forum

2 rue André Pascal

75775 Paris Cedex 16

France

T +33 (0)1 45 24 97 10

F +33 (0)1 45 24 13 22

Email : itf.contact@oecd.org

Web: www.internationaltransportforum.org