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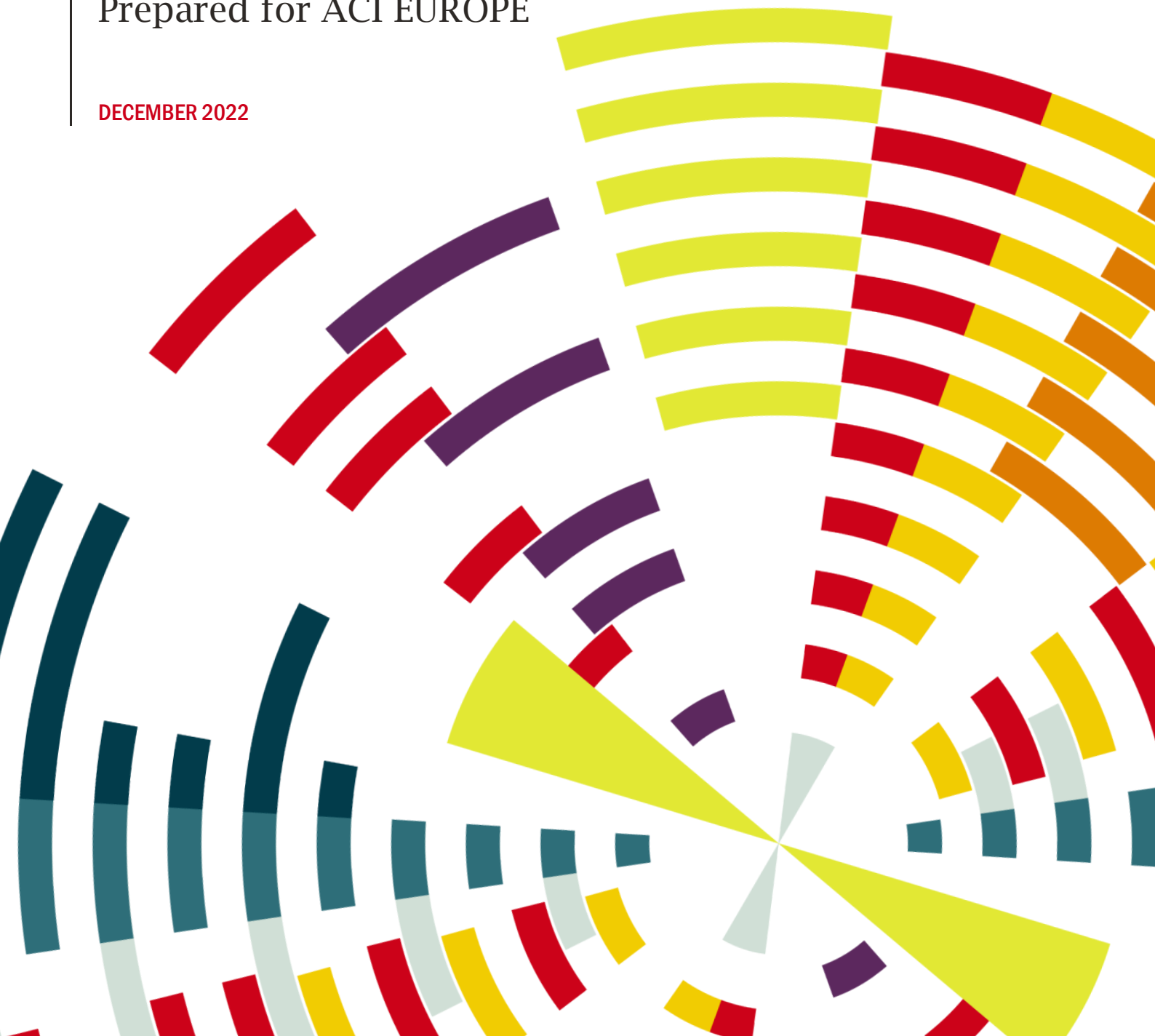
AIRPORT COMPETITION EUROPE: RECENT AND FUTURE DEVELOPMENTS

Prepared for ACI EUROPE

DECEMBER 2022



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SUMMARY

Airport competition in Europe continued at a high level from 2016 to 2019, and as the industry recovers from Covid-19 looks set to strengthen further.

Previous work, including two studies commissioned by ACI EUROPE[1] and a range of other studies[2], illustrated how airports compete with each other. This study extends the data analysis contained in those previous studies and introduces new mechanisms and indicators of the extent of competition between airports in Europe.[3]

Competition between airports is important because – ultimately - it benefits consumers. Consumers benefit from competition between airports in a number of ways that include:

- **Total price offered to passengers:** where airports compete with each other on the price they charge to airlines and passengers (collected via airlines) i.e., on the level of airport charges, this will reduce airlines' costs and therefore – at the aggregate level – the prices that airlines charge to passengers.[4] Airlines set the final price offered to passengers based on the markets they operate in and their yield management systems. Airport charges are a relatively small part of this total price charged to passengers, but if they are set at a level that enables airlines to offer new routes and/or increased frequencies, it will increase the range of services offered and tend thereby to reduce the overall average airfares charged to passengers.
- **Service quality:** airports compete with each other to attract airlines and passengers who have a choice of which airport to use. By competing to attract airlines, airports have a strong incentive to offer airlines products and services that airlines find attractive, which will generally align with passenger preferences (for example, efficient operations). In addition, airports have a strong incentive to offer passengers the types of services and facilities that they would like, including adequate terminal capacity and service hours.
- **Improved surface access links**: surface access links play an important role; where airports compete with each other to attract passengers from a particular geographic area, they have an incentive to invest in improving surface access links to the airport. Surface access links can stretch for 100s of kilometres, with airports and other stakeholders investing in long-distance bus or rail lines that bring passengers to airports.

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[1] Copenhagen Economics (2012) *Airport competition in Europe*; and Oxera (2017) *The continuing development of airport competition in Europe*.

[2] See, for example, Rietveld, P. Nijkamp, P. and Pels, E. (2000) *Airport and Airline Competition for Passengers Departing from a Large Metropolitan Area*. Vol. 48, No. 1. Journal of Urban Economics; Barrett, S. (2000) *Airport competition in the deregulated European aviation market*. Vol. 6, issue 1. Journal of Air Transport Management; Button, K (2021) *Studying the empirical implications of the liberalization of airport markets*. Vol. 21(3) 223–243. Competition and Regulation in Network Industries; Bilotkach, V (2020) *Airport competition from airports' perspective: Evidence from a survey of European airports*. Vol. 21(3) 275-296. Competition and Regulation in Network Industries.

[3] This study examines trends across Europe and does not assess the situation of any particular airport or country. Europe is defined as countries containing an airport which is a member of ACI EUROPE. A list is provided in Annex A.

[4] Airport charges may increase but still result in lower air fares when the increase finances airport capacity expansion allowing new airline entry or expansion.

Airports compete for airline services and passengers because a small change in passenger numbers can result in a substantial change in profitability: this is a typical result for businesses with high proportions of fixed costs - small changes in volumes result in much larger changes in profitability. This characteristic of airports means that the marginal (i.e., incremental) airline services and passengers are of substantial importance to airports. This gives strong reasons in theory to expect airports to compete for airline services and passengers. As we will see, the statistical and market evidence fully supports this theoretical expectation.

Marginal passengers and services are disproportionately important to airline profitability, and airlines use this aspect of airport economics in negotiations with airports to reduce prices and increase service quality.

As airports cannot discriminate between airlines or passengers (as required by the EU Airport Charges Directive), the negotiating power that airlines derive from having the ability to move (or the credible threat of moving) capacity creates a mechanism by which those "marginal services" work to the benefit of all airlines operating at an airport. In other words, airport competition works "at the margins" but that margin cannot be directly observed by the airport (while an airport can be expected to have a sense of which routes/services are marginal, it will have much less information on this than airlines) – and thus disciplines the behaviour of the airport vis-à-vis all airlines, both existing and potential.[5]

Naturally, the Covid-19 pandemic fundamentally affected the aviation sector, reducing passenger volumes across the European aviation network to very low levels. This study therefore looks separately at two time periods: the period up to 2019, and 2020-22.

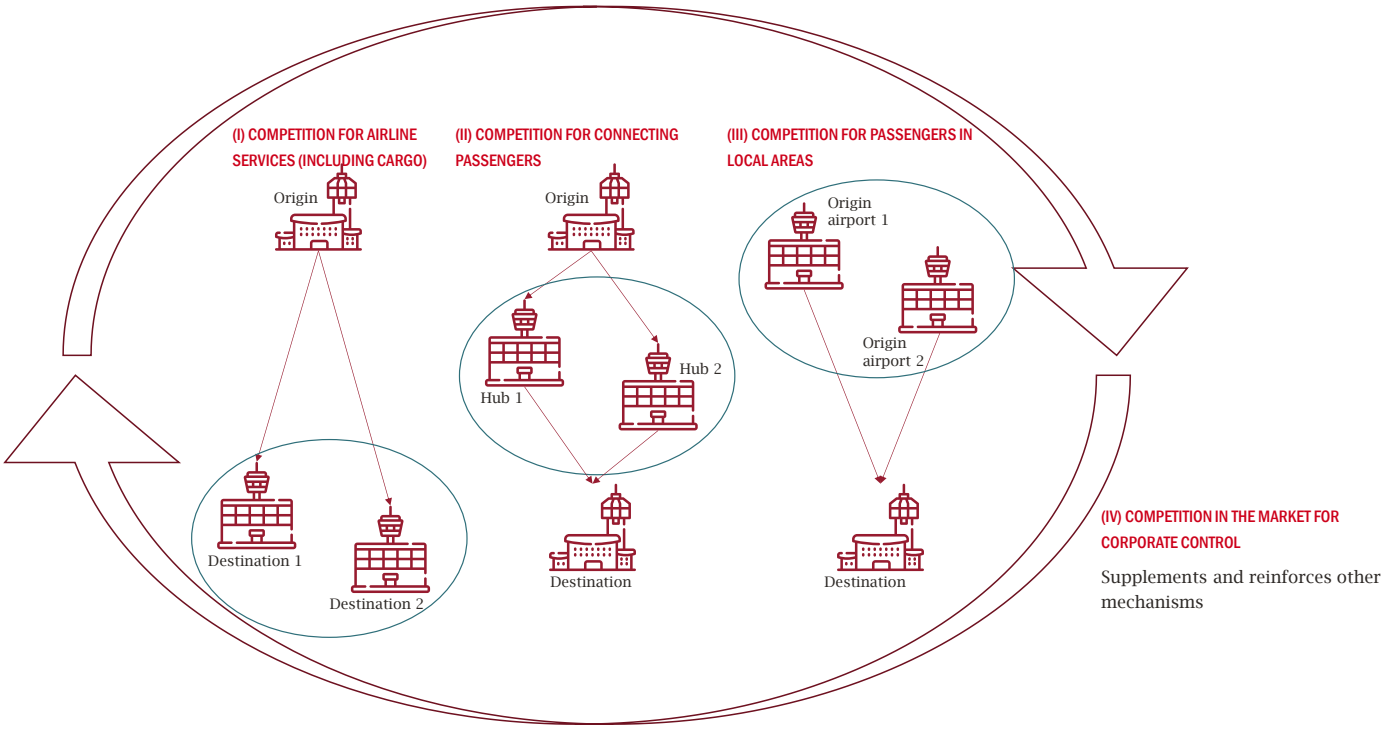
For the period up to 2019, this study looks at four mechanisms through which airports compete:

- For **airline services**: airports compete with each other for airline services. The mobility of aircraft and, in particular, of point-to-point business models means that such competition is geographically disparate – in effect, pan- European.
- For **connecting passengers**: passengers travelling long-haul, particularly from smaller cities, often need to change planes between their origin and destination; typically flying on a smaller plane to hub feeding larger long-haul planes or other short-haul flights. These are known as connecting passengers. Those connecting passengers can often choose between a number of different hubs in Europe and the Middle East.
- For **passengers in local areas**: where there is more than one airport operator serving a particular city or area, and there are flights from those airports to a particular destination, a passenger can choose which airport they would like to use.
- In the **market for corporate control** (a new mechanism outlined in this study): many airports are active in the market to own or operate other airports (in whole or in part). This creates competition between airports at the time the concession or management contract is let. Airports will be assessed on their record and performance, including in attracting services and growing business, reinforcing the competitive pressures from other sources.

[5] Even if an airport could identify which airline services were marginal, it is prevented from segmenting its customer base in this way and so the marginal airline services discipline the behaviour of the airport with respect to all of its customers. It is also important to note that new routes are not necessarily the same as marginal services: where airlines are reviewing the profitability of all services, marginal services will be those where the profitability of a service is close to the airlines chosen profitability threshold. New services may be marginal, or not, depending on their performance. Airports will also compete to retain 'marginal' existing services.

These competitive mechanisms are illustrated in the following figure.

FIGURE 1 VISUALISING HOW AIRPORTS COMPETE WITH EACH OTHER



Source: adapted from Oxera report for ACI EUROPE and Frontier Economics. Oxera (2017), "The continuing development of airport competition in Europe", 15 September.

Note: blue line indicates boundary of airport competition for that mechanism.

AIRLINE SERVICES

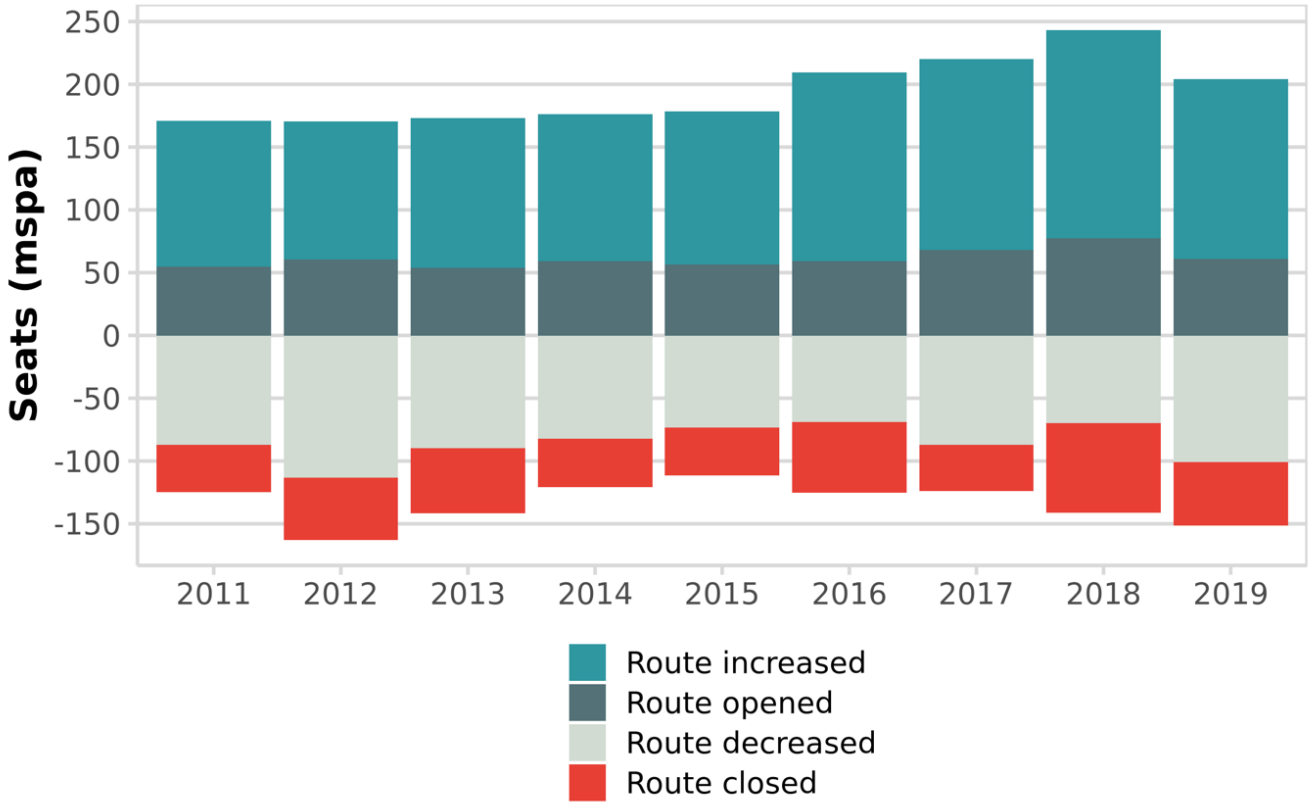
Analysis of airline schedules data shows that route opening and closure rates have remained broadly constant over time, but at a high level, with over 20% of routes opening and closing every year. As would be expected, and consistent with previous research, the largest Low Cost Carriers (LCCs) have a higher rate of route opening and closing than the largest Full Service Carriers (FSCs). However, those FSCs also maintained a high level of route openings and closures, with over 7% of routes operated by the largest FSCs closing and over 10% of routes operated by the largest FSCs opening in any given year. This shows that airlines of all types have substantial rates of opening and closing routes across Europe. These rates indicate the ability of airlines to move their services and, in doing so, to generate competition between airports for that capacity. However, such rates of churn are indicative only. They do not fully capture the extent of competition. First, because routes that remain at an airport may only do so following negotiation against the credible threat of moving demonstrated by these opening/closure rates.

FSCs maintained a high level of route openings and closures, with over 7% of routes operated by the largest FSCs closing and over 10% of routes operated by the largest FSCs opening in any given year.

Second, competition between airports for airline services also involves the retention and growth of service levels in terms of frequencies and seat capacity on existing routes. Additional analysis of airline schedules shows that – between 2016 and 2019 - of the routes in Europe that were not churned (opened or closed in a particular year), over 55% experienced a change of more than 10% of seats from one year to the next (this was more than 10,000 routes from 2018 to 2019), and over 40% of routes experienced a change of more than 20% of seats from one year to the next (or approximately 7,000 routes from 2018 to 2019). This further indicates the dynamic nature of the airline business and the scope of competition between airports for airline services: as illustrated by the figure below, this change in seats on existing routes accounts for a substantially greater amount of change in capacity than the opening and closing of routes.

Over 55% of routes experience a change of more than 10% of seats from one year to the next.

FIGURE 2 CHANGES IN CAPACITY ON EXISTING ROUTES PROVIDE MORE CAPACITY CHANGES THAN THE OPENING OR CLOSURE OF ROUTES



Source: Frontier analysis using OAG data

Note: This chart shows the total seats (million seats per annum) flown in Europe from 2010 to 2019, by the type of route. Europe is defined as every country with at least one airport which is a member of ACI Europe. Monaco is excluded as it only has a heliport.

This figure illustrates that airlines can, and do, move capacity across routes and airports: they therefore have a credible threat to move capacity in negotiation with airports to induce reduced prices or improved product offerings. **In effect, airports find themselves competing to attract or retain capacity on all routes, both new and existing.** As airports are often unable to differentiate their charges (except to a limited extent for new route and growth incentives) and the service levels offered to the airlines, this negotiating power will likely affect the charges paid, and service quality received, by all airlines at a particular airport. **This aspect of competition takes place over a broad geographic area – in effect, across Europe and in some cases beyond Europe.**

"Lufthansa Group is increasingly able to move fleets and traffic wherever the conditions are best for quality, growth and cost effectiveness"

Lufthansa Group Press Release, 27 September 2018.

This perspective of airlines being able to move capacity is supported by significant qualitative evidence from airline (both LCC and FSC) statements and press releases. For example, Lufthansa in 2018 stated that "Lufthansa Group is increasingly able to move fleets and traffic wherever the conditions are best for quality, growth and cost effectiveness"[6]. The market evidence shows that most airports have responded to this competitive dynamic by increasing their budgets for route development activity over the last five years and is further demonstrated by airports' systematic presence at route development conferences where they market their airport to airlines to attract new capacity.

CONNECTING PASSENGERS

In addition to the competition for airline services, the largest airports in Europe have an additional aspect of competition: for connecting passengers**. This competition takes place over a wide geographic area, with European hubs competing with each other inside the EU, UK and Turkey, and beyond, including with hubs in the Middle East.** The evidence from airline schedules is that this type of competition has remained high since 2016 with most European hubs facing competition from hubs to the east on 30%-80% of the connecting routes. **Hub bypass has remained important, with some airports seeing an upward trend in the proportion of connections for which a direct flight is available.**

Most European hubs face competition on 30%-80% of their routes.

The evidence from airlines indicates that they proactively seek to increase competition between hubs. See for example, the statement from IAG on its plan to purchase Air Europa that the transaction would "transform IAG's Madrid hub into a true rival to Europe's big four hubs: Amsterdam, Frankfurt, London Heathrow and Paris Charles De Gaulle."[7]

[6] Lufthansa Group (2018) *Lufthansa Group optimizes hub management of the network airlines and prepares for moderate growth in summer 2019.* Available at: https://investor-relations.lufthansagroup.com/fileadmin/downloads/en/financial-reports/shareholder-info/LH-shareholder-info-2018-11-e.pdf (Accessed: 20 May 2022).

[7] International Airlines Group (2019) *Agreement for the acquisition of Air Europa for €1 billion.* Available at : https://www.iairgroup.com/en/newsroom/press-releases/newsroom-listing/2019/iag-air-europa (Accessed: 26 July 2022).

PASSENGERS IN A GEOGRAPHIC AREA

In addition to the two mechanisms of airport competition outlined above, where there is more than one airport in a region[8], these airports can compete directly for passengers in that local area. **The analysis for this study, consistent with that for previous studies, indicates that this type of competition is largely constant over time but has decreased somewhat for the smallest airports (with less than 5 million seats per annum - mspa - in 2019) while increasing for the largest airports (with over 40mspa in 2019) since 2010.** These gradual changes for the largest airports are consistent with the view that it can take many years for changes in surface access networks to be implemented and so any changes in the competitive landscape in this dimension will play out over a scale of years or decades, whereas competition for airline services and connecting passengers is much more fast-acting: taking weeks or months to evolve.

THE MARKET FOR CORPORATE CONTROL

The market for corporate control of airports is a 'repeated game' whereby airport performance is successively factored into competitions for control. **This would likely serve to create additional incentives for airports to compete for airline services and passengers, through price and service quality.**

In assessing the evidence for a market for corporate control of airports, analysis of the extent of activity on airport-related transactions[9] indicates that activity on the corporate control of airports has increased over time. Having a successful track record of increasing airline services and passenger volumes, along with associated service quality and investment performance, will be an important factor in being invited to bid in future transactions. The quote from Lisbon airport below shows how its ownership by Vinci Airports has resulted in focus on innovation in a particular aspect of airport operations. In turn, this increased innovation within airport groups active in this market is seen by those airport groups as providing them with a competitive advantage.

> " LISBON AIRPORT IS ONE OF THE FIVE VINCI INNOVATION CENTRES OF EXCELLENCE NAMELY FOR SMART TERMINAL OPERATIONS AND TECHNOLOGY, WHERE NEW CONTACTLESS SOLUTIONS ARE IMPLEMENTED OR ADAPTED FOR MORE AUTOMATED BOARDING PROCEDURES, WITHOUT COMPROMISING SAFETY OR SECURITY. "[10]
>
> LISBON AIRPORT

[8] And those airports are under different ownership.

[9] Based on data from Inframation and covers transactions related to concessions, nationalisation, privatisation and acquisitions.

[10] ACI Europe (2020) *ANA Aeroportos de Portugal: "working to guarantee consistently safe conditions in the end-to-end air travel experience".* Available at: http://www.airport-business.com/2020/11/ana-aeroportos-de-portugal-working-guarantee-consistently-safe-conditions-end-end-air-travel-experience/ (Accessed 26 July 2022).

ANALYSIS OF MARKET OUTCOMES

Analysis of a wide range of indicators of the extent of airport competition indicates that airport competition continued at a high level across a wide range of dimensions up to 2019.

In addition to the analysis of airline schedules data, qualitative evidence and corporate control, we have also examined the evidence on the outcomes in the market, particularly the trends in overall customer satisfaction scores and changes in real aeronautical revenue per passenger over time.[11] This analysis shows **customer satisfaction increasing over time for airports of all sizes and aeronautical revenue per passenger declining or flat in real terms**. This is consistent with a market where there is substantial competitive pressure, with airports having strong incentives to avoid price increases where possible and invest to better match customer preferences. One example of this is given in the quote below, with Cardiff Airport investing in transforming the customer experience to attract passengers and airline services.

> "THE LATEST INVESTMENT WILL SIGNIFICANTLY TRANSFORM THE EXPERIENCE FOR CUSTOMERS, OFFERING MORE CHOICE AND QUALITY IN MODERN, WELCOMING SURROUNDINGS." [12]
>
> CARDIFF AIRPORT

EXPERIENCES POST-2019

Considering more recent experience from 2020/22, analysis of airports' experiences shows that airports experienced a dramatic reduction in revenue after 2019. Based on a survey of European airports conducted for this study, airports across Europe pulled every lever to safeguard their businesses throughout the Covid-19 pandemic, in particular: over three-quarters of survey respondents reduced their cost base through reducing their investment programme and temporarily closing facilities, while half made staff redundant, and a quarter permanently revised their maintenance regimes. Almost all airports which responded to the survey made use of available government support and most raised additional external debt to finance their operations.

Airports across Europe pulled every lever to maintain their business throughout the Covid-19 pandemic.

To assist their airline customers, two-thirds of airports also provided airlines with Covid-recovery incentives which usually involved reducing passenger or landing charges.

This approach to managing costs and stimulating demand is consistent with the commercial approach adopted by airlines and hotel chains (both businesses also operating in the travel industry) and reflects airports across Europe acting in a commercial way in response to a major adverse shock.

[11] The largest airports in Europe are subject to economic regulation which affects the prices and quality offered, and these findings will also reflect, to some extent, the outcome of regulation at those airports, as well as competition.

[12] ACI Europe (2017) *Cardiff Airport 'transforming customer experience' with €4.5m investment*. Available at: http://www.airport-business.com/2017/10/cardiff-airport-transforming-customer-experience-e4-5m-investment/ (Accessed 26 July 2022).

As passengers return to flying, **airports' experiences are consistent with competition for airline services intensifying**. Airports responding to the survey noted that business travel is returning more slowly than leisure travel (and as leisure travel is likely to be more price sensitive, this will increase pressure on airlines and airports to manage/reduce costs); that LCCs are returning to the market faster than FSCs (and LCCs are more likely to move routes between airports, suggesting a higher degree of competition between airports for routes operated by LCCs); that airlines of all types are negotiating harder for discounts than before the Covid-19 pandemic; and that airlines are working to shorter planning horizons (suggesting that airlines have a greater negotiating capacity than was the case before the Covid-19 pandemic as they have a greater credible threat of moving capacity at relatively short notice). **All of these factors point towards increasing competition between airports for airline services as the industry recovers from the Covid-19 pandemic.** These experiences from airlines are consistent with publicly available information[13] on airlines, particularly LCCs, inviting airports to compete with each other for airline services, two examples of which are provided as highlighted text to the right. These trends, coupled with the creation of new routes – in 2021 and 2022, more than 35% of existing routes did not exist in 2019 – show the fluidity of the market airlines currently work in.

"EasyJet invited airports to make Apprentice-style pitches during 20-minute Skype sessions"

Quote attributed to Reuters article: https://www.reuters.com/article/health-coronavirus-airlines-airports-idCNL8N2D81QZ

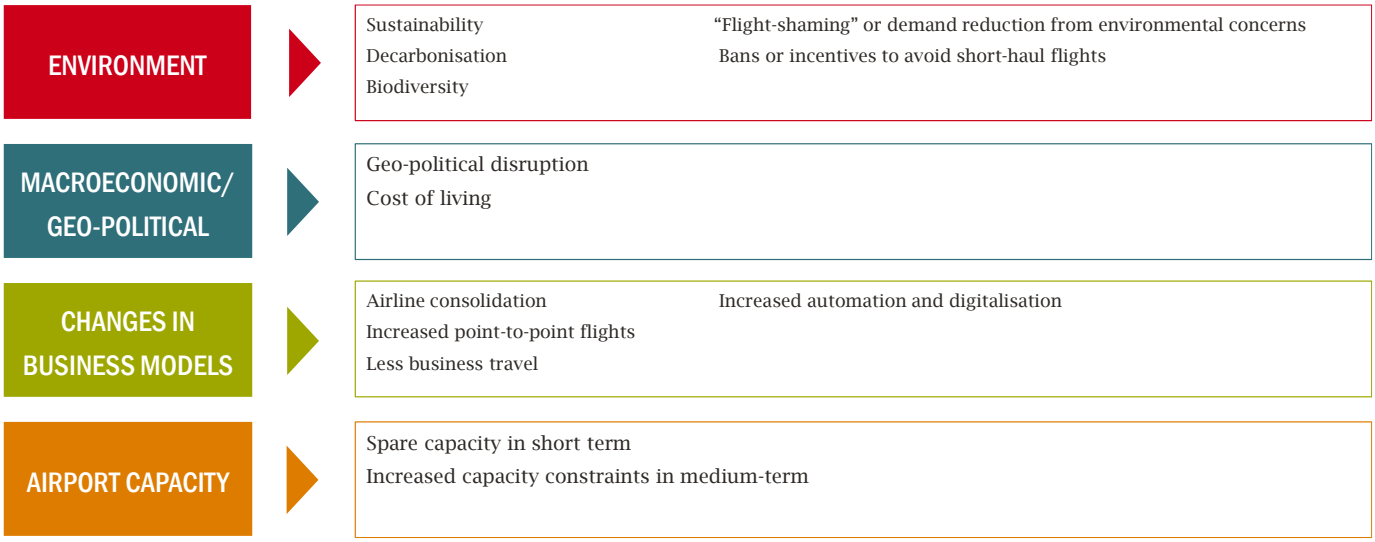
"Significant shifts in network strategy resulting in capacity reallocation between airports"

Quote attributed to Wizz Air in Reuters article: https://www.reuters.com/article/health-coronavirus-airlines-airports-idCNL8N2D81QZ

Given these experiences and the significant spare capacity at most airports arising from the reduction in flights due to the Covid-19 pandemic, there is likely to be intense competition between airports for airline services over the coming years and, as/when long-haul services reopen, it seems likely that competition for connecting passengers will be similarly intense. If we look further ahead to the factors affecting the aviation industry over the next five to ten years, a survey of airport views and assessment of external evidence highlighted four overarching themes which are likely to affect the aviation industry, as illustrated in the figure below.

[13] See, for example Reuters (2020) *Budget airlines put squeeze on airports in coronavirus cost drive*. Available at: https://www.reuters.com/article/health-coronavirus-airlines-airports-idCNL8N2D81QZ (Accessed 26 July 2022).

FIGURE 3 FUTURE TRENDS



Source: Frontier Economics.
Note: Based on external evidence, airport survey and a special workshop of ACI Europe's airport charges taskforce.

Not all of these trends will affect airport competition, but **many of them will serve to increase (or support the continued presence of) the competitive pressure between airports** by:

- slower demand growth (for example if there is increasing avoidance of flying because of environmental concerns or simply if flying becomes more expensive as a result of cost increases), thus increasing the extent of spare capacity (relative to a situation with faster demand growth) and therefore the competitive pressure to retain existing airline services and attract new airline services;
- increasing the requirements of financial markets to demonstrate compliance with environmental goals (i.e., the mechanism of competing for corporate control may open a new dimension on which airports will compete: that of sustainability); or
- enhancing the negotiating positions of airlines.

However, one of the key factors affecting how intense this competition is likely to be is the extent to which there is spare capacity at airports: while airports will still compete if there is no spare capacity (for example for a "better" mix of passengers and airlines or for higher achieved load factors), the competition will likely be stronger where there is spare capacity at airports, and we do see that recovery from the Covid-19 pandemic has left significant spare capacity within the airport network, at least temporarily,

OVERALL FINDINGS

Taken together, **the extensive data assembled for this report demonstrate the continued competitive pressures faced by airports**. These need to be assessed together because it is the cumulative pressure from all sources that affects airport behaviour. The implication of this evidence for the development of regulatory regimes at airports is clear: in keeping with regulatory best practice, regulation should be considered in the context of the reality of the market situation faced by airports. **This report has presented evidence on a wide range of indicators of competition indicating that there are competitive pressures experienced by airports of all sizes, that they have increased in the wake of the Covid-19 pandemic and are set to increase even further in the coming years. These pressures should be**

carefully considered by regulators and policymakers to avoid regulation which is unnecessary, overly costly or poorly targeted.

1 INTRODUCTION

Successive studies commissioned by ACI EUROPE[14] and a wider literature[15] have established that airports compete in a number of ways to grow their customer base (of airlines and passengers), and to protect the customer base that they have. This study assesses: the level and working of competition between airports in the years before the Covid-19 pandemic forced air transport globally into near hibernation; the activities of airports during the Covid-19 pandemic; and examines future trends likely to affect the European aviation industry and assesses what these may mean for airport competition.

This report builds on the previous work on the topic of airport competition to:

- further develop a conceptual framework about how airport competition operates and benefits consumers (section 2);
- analyse how the European aviation market developed up to the onset of the Covid-19 pandemic (section 3);
- examine how airport competition in the European aviation market developed up to the onset of the Covid-19 pandemic (section 4);
- examine how European airports responded to the Covid-19 pandemic and what this may tell us about the competitive and commercial forces bearing on airports (section 5);
- consider the key trends which may shape the European aviation industry over the next 5-10 years, and what these trends might mean for airport competition (section 6);
- offer some conclusions and recommendations on what this body of evidence means for the airport regulation through the ACD or any revised arrangements, either national or international (section 7).

This study assesses the overall situation of airport competition across Europe[16] by analysing a wide range of data and other evidence. While the precise interplay of competitive forces will vary between airports and countries, this study establishes presumptions about the nature and degree of airport competition and in

[14] Copenhagen Economics (2012) *Airport competition in Europe*; Oxera (2017) *The continuing development of airport competition in Europe.*

[15] Including Rietveld, P. Nijkamp, P. and Pels, E. (2000) *Airport and Airline Competition for Passengers Departing from a Large Metropolitan Area*. Vol. 48, No. 1. Journal of Urban Economics; Barrett, S. (2000) *Airport competition in the deregulated European aviation market*. Vol. 6, issue 1. Journal of Air Transport Management; Starkie, D. (2002) *Airport regulation and competition.* Vol. 8, issue 1. Journal of Air Transport Management; Gardiner, J. Ison, S. Humphreys, I. (2005) *Factors influencing cargo airlines' choice of airport: An international survey*. Volume 11, Issue 6. Journal of Air Transport Management; Starkie, D. (2009) *The Airport Industry in a Competitive Environment: A United Kingdom Perspective*. Discussion Paper 2008-15 OECD/ITF; Forsyth, P. Gillen, D. Muller, J. and Niemeier, HM. (2010) *Airport Competition: The European Experience*; Ashgate. Morrell, P. (2010) *Airport Competition and Network Access: A European Perspective*. Forsyth, P. Gillen, D. Muller, J. and Niemeier, HM. *Airport Competition: The European Experience*; Starkie, D. (2012) *European airport and airlines: evolving relationships and the regulatory implications*. Volume 21. Journal of Air Transport Management; Copenhagen Economics (2016) *Airport competition in Germany: airport and airline market power*; Bush, H. Starkie, D. (2014) *Competitive drivers towards improved airport/airline relationships*. Volume 41. Journal of Air Transport Management. Adler, N. Liebert, V. (2014) *Joint impact of competition, ownership form and economic regulation on airport performance and pricing, Transportation Research Part A: Policy and Practice*. Volume 64; Lieshout, R. Malighetti, P. Redondi, R. and Burghouwt, G. (2016) *The competitive landscape of air transport in Europe*. Volume 50. Journal of Transport Geography; Button, K (2021) *Studying the empirical implications of the liberalization of airport markets*. Vol. 21(3) 223–243. Competition and Regulation in Network Industries; Bilotkach, V (2020) *Airport competition from airports' perspective: Evidence from a survey of European airports*. Vol. 21(3) 275-296. Competition and Regulation in Network Industries.

[16] In this study, "Europe" is defined as any country containing an airport which is a member of ACI EUROPE. A list is provided in Annex A.

particular that it is now pervasive, effectively constraining the conduct of most airports to a significant extent.

2 HOW DOES AIRPORT COMPETITION AFFECT CONSUMERS?

SUMMARY

Airports are businesses with relatively high proportions of fixed costs, which means that marginal airline services and passengers contribute disproportionately to incremental profitability. This means that airports have a strong incentive to compete with each other where there is scope for growing their customer base of airline services or passengers.

Airports compete with each other through four, interlocking and cumulative, mechanisms:

- Competition for airline services: airlines provide services using aircraft which are internationally mobile and can be – and are - moved from one airport to another. Airports compete with each other for new services, and to retain existing services across broad geographic areas – effectively Europe as a whole;
- Competition for connecting passengers: the largest airports also compete for passengers taking a connecting flight; this competition takes place across a wide geographic area, with hubs in Europe competing with each other and with the large hubs in the Middle East;
- Competition for local passengers: where there are multiple airports (under separate ownership) serving a defined geographic area, those airports compete for passengers in that geographic area.
- In the market for corporate control: where there are opportunities to own or operate all or part of an airport, airports compete for those opportunities. This establishes a market for corporate control of airports, which creates a "repeated game" where reputation for delivering a successful airport is important to being invited to bid for future opportunities, thus creating an additional incentive for airport groups active in this market to compete for airline services, which reinforces the mechanisms outlined above. This market for corporate control also facilitates the spread of best practice and innovation across throughout the airport sector, because being active in the market for corporate control incentives increases in innovation as it is seen to provide a competitive advantage in future competitions. This mechanism therefore adds to and supports the other three mechanisms.

These four mechanisms of airport competition benefit consumers by:

- Reducing the total air fare offered to passengers: where airports compete with each other on the price they charge to airlines and passengers (collected via airlines) i.e. on the level of airport charges, this will reduce airlines' costs and therefore – at the aggregate level – the prices that airlines charge to passengers[17]. Airlines set the final price offered to passengers based on the markets they operate in and their yield management systems. Airport charges are a relatively small part of this total price, but if they are set at a level that enables airlines to offer new routes

[17] Airport charges may increase but still result in lower air fares when the increase finances airport capacity expansion allowing new airline entry or expansion.

and/or increased frequencies, it will increase the range of services offered **and tend thereby to reduce the overall average airfares charged to passengers**.

- Improving service quality: airports compete with each other to attract airlines and passengers who have a choice of which airport to use. By competing to attract airlines, the airports have a strong incentive to offer airlines products and services which airlines find attractive and which will generally align with passenger preferences (such as efficient operations). Airports also have a strong incentive to offer passengers themselves the types of services and facilities that they would like**, including adequate terminal capacity and service hours**, both to attract passengers directly and because that attractiveness will play into airline location decisions.
- Improving surface access links: surface access links play an important role; where airports compete with each other to attract passengers from a particular geographic area, they have an incentive to invest – sometimes with partners with aligned economic or social interests - in improving surface access links to the airport.

Competition between airports can therefore be expected to benefit consumers both directly (through providing improved quality of service) and indirectly (by enabling improved airline service offerings).

In thinking about the functioning of any market, it is useful to start from the final outcomes: what the market delivers for consumers, and in particular the price and quality of the products and services available in a given market. At the highest level, this is because enterprises exist to create products and services which are valued by society to increase consumer welfare.[18]

In this section, we outline how airport competition can affect consumers:

- starting from the key economic players in the aviation market and their relevant characteristics;
- outlining what consumers want from the aviation market;
- considering how those consumer preferences drive variations in airport and airline business models, and how those business models combine to shape competitive dynamics between airports;
- how that airport competition therefore affects consumers;
- the relationship between competition and regulation; and
- what the unintended consequences of inappropriate forms of regulation in this market might be.

2.1 KEY ECONOMIC PLAYERS IN THE AVIATION MARKET AND THEIR CHARACTERISTICS

The aviation industry is a complex ecosystem of different parties including, among others, airports, airlines, Air Navigation Service Providers (ANSPs), regulators (safety, consumer protection, economic), ground handling agents, government agencies such as customs and immigration. In this report, we focus on the key relationships relevant to airport competition: the relationships between passengers, airlines and airports.

The different economic players relate to each other in a number of ways:

[18] As stated on the DG COMP website "Competition policy encourages companies to offer consumers goods and services on the most favourable terms. It encourages efficiency and innovation and reduces prices." Available at: https://ec.europa.eu/competition-policy/index_en#:~:text=Competition%20policy%20encourages%20companies%20to,and%20innovation%20and%20reduces%20prices (Accessed 26 July 2022).

- passengers desire to travel from an origin to a destination for some purpose: this might be to attend a business meeting, for a holiday or other leisure trip, or to visit friends or relatives. Some proportion of passengers is likely to be flexible in their choice of destination, for example, wanting to travel to a "European city" rather than having a fixed destination. They have a relationship with both the airline (which has extensive details about the passengers flying with them) and the airport which has less information on the characteristics of those passengers but nevertheless receives some revenue directly from them, for example through retail spending or car parking (or will receive revenue from concessionaires offering those services, depending on the contractual arrangements);
- airlines receive ticket and other ancillary revenues from passengers in exchange for transporting them between their origin and destination, using aircraft which are internationally mobile assets and with relatively limited restrictions on where those aircraft are based within the EU[19]. Airlines can move their aircraft to wherever the opportunity for profitability is greatest. According to data from IATA, user charges accounted for an average of approximately 10% of airlines' costs in 2019[20]. This figure is likely to include airport charges, as well as ground handling charges and, potentially, air navigation services charges. An older, but clearer, source from IATA suggests that airport charges were an average of 4.9% of airline costs in 2015[21];
- airports have both a direct engagement with passengers and provide services to the airlines. Airlines pay airports for the use of the airport infrastructure. These charges can take a number of forms but are typically levied on a per passenger and/or per tonne of maximum take-off weight for each Air Transport Movement (ATM) basis. Airports are infrastructure businesses with a substantial proportion of fixed costs. This combination of a high proportion of fixed costs and receiving revenue per passenger and per ATM means that the marginal airline service and passenger has a substantial impact on airport profitability, as illustrated by the stylised example below.

Passengers and airlines are considered in more detail below and we start by thinking more about the implications of those economic characteristics of airports, and what they mean for airport incentives. We use a simple example to consider the increase in the profitability of a hypothetical airport if passenger volumes change by 5% and all other factors remain the same. As can be seen by comparing Scenario 1 with Scenarios 2 and 3 in the table below, a 5% change in passenger numbers translates into a 30% change in profit for this hypothetical airport. While the reality of airport operations is substantially more complex than this simple example, this clearly illustrates an important point about the economics of airports: that, because of the high proportion of fixed costs, marginal passengers (and services) are very valuable in contributing to airport profitability. At this stage, it is worth noting that it is difficult for airports to identify precisely which services and passengers are marginal[22] in the sense of being most likely to switch

[19] Although we note that there are legal, regulatory and practical restrictions which limit the extent to which those assets can be moved between countries within the EU, but these are limited in most cases.

[20] IATA (2019) *IATA Economics' chart of the week: significant regional variation in major operating cost items*. Available at: https://www.iata.org/en/iata-repository/publications/economic-reports/significant-regional-variation-in-major-operating-cost-items/ (Accessed: 26 July 2022).

[21] IATA (2015) *Airline cost management group (ACMG)*. Available at: https://www.iata.org/contentassets/3b5a413027704ce08976fe1890fb43e2/acmg_highlights.pdf (Accessed: 26 July 2022).

[22] While airports are likely to have some information on the success of routes/services (for example, on the number of passengers), they will not have detailed information on the degree of commercial success of a route or service in the way that airlines will. There is therefore an asymmetry of information between the airline (which knows which routes are marginal and which are not) and the

away from the airport if airport charges increased[23], and (even if they could identify which services are marginal) the requirement to charge on an "objective and transparent" basis from the ACD limits airports' ability to differentiate between marginal and non-marginal passengers/services. Therefore, competition for those marginal services (either new services, or retaining existing services) benefits all passengers/airlines operating at an airport as an airport has limited ability to differentiate between marginal and non-marginal services.[24]

TABLE 2 THE IMPORTANCE OF MARGINAL PASSENGERS

	SCENARIO 1	SCENARIO 2	SCENARIO 3
Number of passengers [A]	100	105	95
Airport landing/passenger charge per passenger (€) [B]	10	10	10
Airport non-aeronautical revenue per passenger (€) [C]	10	10	10
Airport revenue (€) [D = A x (B+C)]	2,000	2,100	1,900
Airport fixed costs (€) [E]	1,000	1,000	1,000
Airport variable costs per passenger (€) [F]	8	8	8
Total airport variable costs (€) [G = A x F]	800	840	760
Total airport costs (€) [H = F + G]	1,800	1,840	1,760
Airport profit [I = D – H]	200	260	140

Source: Frontier Economics.

Note: This is a simplified, illustrative example. It would not apply at an airport subject to regulation which caps annual revenue across aeronautical and non-aeronautical revenue: in this case, the airport revenue [C] would be fixed and fewer passengers would result in lower costs and therefore higher profitability.

This contribution of marginal passengers/services to profitability gives airports of all types a strong incentive to secure additional services (new routes but also additional frequencies/capacity on existing routes) to retain existing services and attract additional passengers by acting in a way which meets consumer preferences and, given this, it is worth considering what those consumer preferences are.

airport (which is likely to have some insights but not be entirely sure). In the presence of this information asymmetry, airports will be unable to identify marginal routes and services with certainty.

[23] New routes are not necessarily the same as marginal routes: where airlines are reviewing the profitability of all routes, marginal routes will be those where the profitability of a route is close to the airlines chosen profitability threshold. New routes may be marginal, or not, depending on their performance.

[24] Airports can, and do, differentiate charges based on service offerings used by airlines.

2.2 CONSUMERS HAVE A DIVERSE SET OF PREFERENCES FOR WHAT THEY WANT FROM THE AVIATION MARKET

Passengers use aviation to travel from one place to another and have varying needs / reasons for travel at particular times or to particular destinations. For example, it may be of substantial importance to arrive at a particular location for a business meeting or to attend a wedding; but there may also be flexibility in either (or both of) the time of travel or the destination where passengers can choose across a number of destinations as part of their decision on whether/where to travel (or not) i.e. some proportion of passengers are "footloose" and make choices across a range of destinations such as "city breaks" or "winter sun".

There has been extensive research into what consumers want from the European aviation market.[25] This can be characterised as:

- low air fares;
- high connectivity (measured as range of destinations, high frequency of service, taking as little time to get there as possible);
- reliable services;
- high quality of service (cleanliness, customer service, communication when things go wrong).

However different consumers (or the same consumer travelling for different reasons, for example travelling for business compared with travelling for leisure) will have different preferences about the balance between these factors. The amount of flexibility that a consumer has in terms of time of travel, ultimate destination, whether to travel or not, and their personal circumstances will give rise to a wide range of preferences: and airline and airport business models have developed to satisfy these.

None of these factors is uniquely within the control of any of the key economic players outlined above. For example, evidence from IATA shows that airport charges are approximately 5% of airlines' costs and passengers are unlikely to be aware of what proportion of the cost of their ticket is paid to the airport. Nevertheless, passengers will directly experience the airport facilities such as the retail / food & beverage offerings, waiting areas, security screening processes, lounges, etc and indirectly experience other parts of the airport offering, such as certain aspects of reliability and operational efficiency. As passengers are likely to be unaware of the costs of the airport infrastructure, but do experience (directly and indirectly) the quality of service provided by the airport, it is likely that passengers' expectations of airports will focus around quality of service rather than price. Given the range of passengers' preferences, there is a wide range of airline and airport business models which seek to match those preferences. There are also likely to be tensions between airports (which face customers who experience a quality of service from the airport without direct knowledge of the price they are paying for that service) and airlines (which experience airport charges as a cost and face passengers only knowing the price they have paid for the ticket).

[25] See, for example, McKinsey (2022) *Opportunities for industry leaders as new travelers take to the skies.* Available at: https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/opportunities-for-industry-leaders-as-new-travelers-take-to-the-skies (Accessed 26 July 2022). Other research includes: The Moodie Davitt Report (2014) *New initiatives boost passenger satisfaction at Frankfurt Airport*. Available at: https://www.moodiedavittreport.com/new-initiatives-boost-passenger-satisfaction-at-frankfurt-airport/ (Accessed 27 April 2022); easyJet (2022). Available at: https://corporate.easyjet.com/about/strategy#:~:text=Customers%20don't%20just%20want,and%20frequencies%20from%20these%20markets (Accessed 27 April 2022); Ryanair (2022). Available at: https://corporate.ryanair.com/about-us/our-customers/ (Accessed 27 April 2022); and Lufthansa Group (2022). Available at https://www.lufthansagroup.com/en/responsibility/product-responsibility.html (Accessed 26 July 2022).

2.3 A DIVERSE RANGE OF AIRLINE AND AIRPORT BUSINESS MODELS SERVE THESE DIVERSE PREFERENCES

On the airline side, there is a wide range of business models, ranging from focussing almost exclusively on controlling costs (which may involve using secondary airports some way from the destination city and basic passenger facilities) to premium provision focussing on providing a high level of service to customers, and everything in between. While the terms Low Cost Carrier (LCC) and Full Service Carrier (FSC) are often used in the industry (and are used later in this report) for convenience, in reality there is much variety hidden by these terms; and the boundary between these groups is blurred and is continuing to evolve – especially with the hybridisation of airlines' business models (for example, LCCs moving upmarket into primary airports and FSCs following some of the strategies of LCCs and replicating their simplified/unbundled service offerings.

For FSCs (operating in Europe) it is also worth drawing a distinction between Europe-based carriers (such as Lufthansa or Air France-KLM) and non-Europe-based carriers (such as Cathay Pacific or Singapore Airlines). This arises because those Europe-based carriers will usually have one end of their route at a European hub airport where they have substantial existing operations (which we term as FSC "home"); while for non-Europe-based carriers, their European operations will almost always be at an airport where they do not have significant hub operations (which we term FSC "visiting"). Europe-based carriers which are making decisions about services to provide away from a hub can be expected to behave similarly to non-Europe-based carriers in i.e., to act like FSC "visiting" carriers in relation to the non-hub ends of routes. This becomes important when we think about the ability of those airlines to change their airport location decisions as they search for the optimal (most profitable) deployment of aircraft. The table below provide an overview of how these groups compare in terms of location decisions, basing strategy and extent of product differentiation.

TABLE 3 COMPARING AIRLINE BUSINESS MODELS

	LCCS	FSCS (HOME)	FSCS (VISITING)
Location decisions	Often provide services to "secondary" airports (although LCCs are increasingly operating from "primary" airports)	Usually provide services from the "primary" airport in a city	Providing services to an airport, where the aircraft will be based at an existing hub, at another airport
Basing strategy	Tend not to have hubs, often having multiple bases with smaller numbers of aircraft at each base	Usually have several hubs at which aircraft from across the FSC's group are already based	Often will not base aircraft at the "visiting" airport, only having aircraft at that airport for as little time as possible
Product differentiation	Tend to offer an undifferentiated service in cabins, with consistent fleets and one-class planes	Tend to offer a differentiated service, with different sizes and styles of aircraft and multiple classes of service on the same plane	

Source: Frontier Economics.
Note: As noted above, there is a spectrum of airline business models and the boundary between LCCs and FSCs is blurred.

Airport business models therefore evolve to meet the needs of airport customers: both airlines and passengers. These business models are diverse and differentiated, with some airports focussing on providing a high quality of service to airlines and passengers (such as Schiphol which aspires to "operate the world's most sustainable, high quality airports"[26]), some focussing on the diversity of their customer base (for example Brussels Charleroi which focuses on the "comfort of its different customers in order to respond to all their needs"[27]) and some focussing on providing particular low cost infrastructure (such as Marseilles and Copenhagen) alongside infrastructure for airlines aiming for a higher-quality, higher-price service offering to their passengers. Airports also put resources into attracting airline services through marketing and business development activity, such as attendance at route development conferences and developing offerings to airlines in conjunction with other interested parties such as tourist boards.

2.4 HOW DOES COMPETITION WORK IN THIS MARKET?

Previous work for ACI EUROPE and others identified three ways in which airports are subject to competitive pressure, to which this study adds a fourth:[28]

- **for airline services**: airlines registered within the EU (including freight airlines) can locate their aircraft at any airport, subject to various practical restrictions; and airlines from outside the EU have a wide choice of where to fly to in Europe. This means that airports (in their dealings with LCCs, non-EU based carriers for the attraction of spokes from FSCs with European hubs, and - for FSCs with European hubs - between those hubs) compete for new capacity, and to retain existing capacity on a pan-European basis. This is because airlines will be comparing propositions from geographically disparate airports, and this comparison will include aspects which are within the control of airports (such as price and non-price characteristics) and the inherent properties of the area served by the airport affecting the profitability of operating to/from that location (for example, the size and income level of the population, leisure and cultural amenities and so on). While airports cannot affect the inherent properties of the wider area, they can and do compete with each other on both price (i.e., the charges they levy for use of airport infrastructure), and non-price (such as service quality, reliability, etc) aspects of their product offering. Airports also compete for the growing air freight market;
- **for connecting passengers**: passengers travelling for long-distances to/from Europe often have a number of choices about where to change planes (this is principally passengers transferring between short-distance "feeder" services and long-distance intercontinental services) and a range of airports compete for these passengers;
- **for passengers in the local area to the airport**: where there is more than one airport serving a city or other area, those airports can compete with each other for passengers located in those areas. The precise definition of these areas can vary substantially depending on the quality of the surface access infrastructure and extent to which the airport integrates with the road and rail networks in the area;
- **the market for corporate control** (which is new for this study and explained in more detail below): where there is competition for the ownership or operation of a whole or part of an airport, then

[26] Schiphol (2022) *Royal Schiphol Group*. Available at: https://www.schiphol.nl/en/schiphol-group/page/company/#:~:text=Our%20ambition%20is%20to%20operate,circular%20in%20the%20long%20run (Accessed 26 July 2022).

[27] Brussels South Charleroi Airport. Available at: https://www.brussels-charleroi-airport.com/en/who-are-we#:~:text=The%20goal%20of%20Brussels%20South,to%20all%20of%20their%20needs (Accessed 26 July 2022).

[28] See, in particular, Oxera (2017) *The continuing development of airport competition in Europe*. p. 7.

airports will compete with each other for these opportunities. Since track record will be a key part of any such competition, there is a spill-over effect into the other ways in which airports compete. This market for corporate control also incentives innovation and the spread of best practice throughout the airport sector because being active in the market for corporate control incentives increases in innovation as it is seen to provide a competitive advantage in future competitions.

THE MARKET FOR CORPORATE CONTROL

The market for corporate control affects airport competition in four distinct ways:

- The market for airport control is a repeated game with limited numbers of airport groups bidding for a discrete number of airports over time. A track record in making existing airport ownership/operation successful by increasing passenger volumes and enhancing performance is likely to figure significantly in the decision-making process. This provides an incentive for the concession-holding company to deliver a well-run, growing (attractive to passengers and airlines) airport through enhancing its reputation and therefore increasing the likelihood of being successful in future bids.

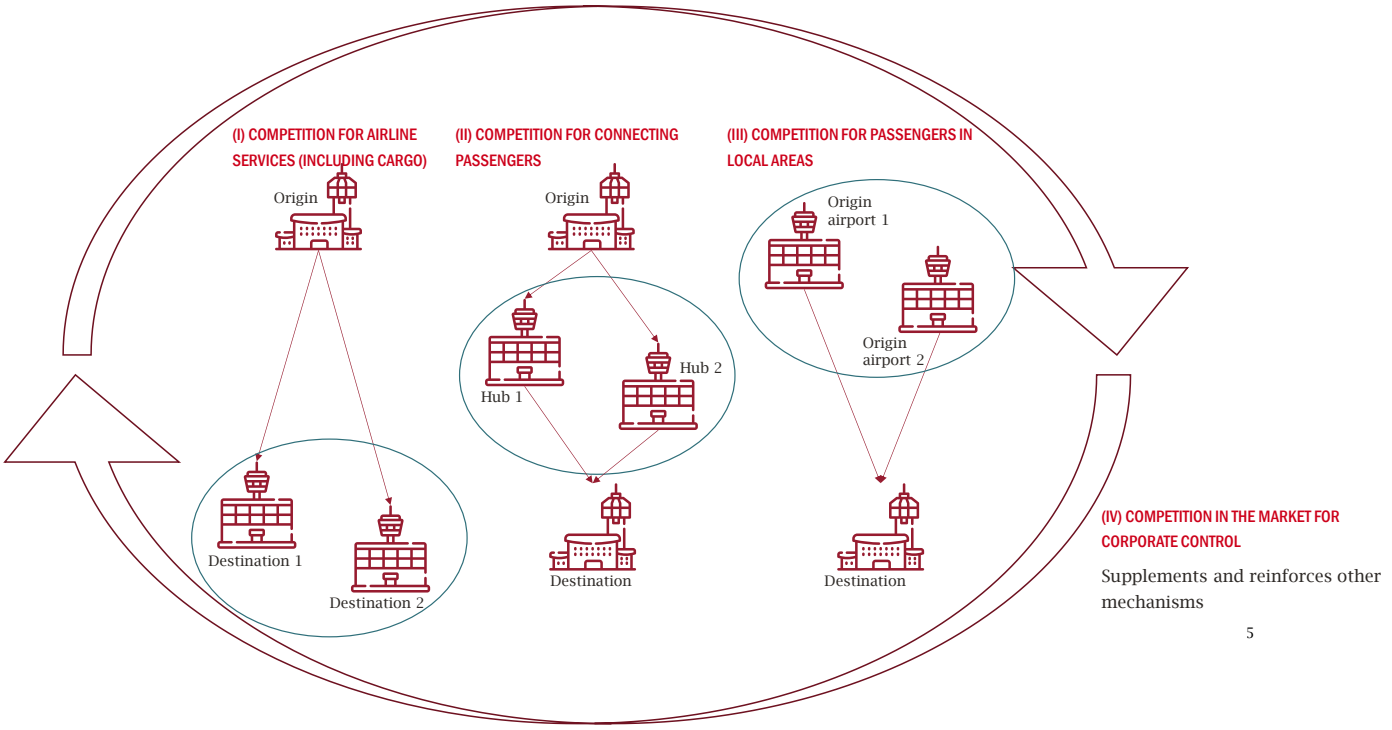
- For airports operating on a concession basis (i.e., operating an entire airport), there will be competition for that concession at the time it is let. This (depending on the way in which the concession is structured) would create strong incentives for the bidder to commit to invest in measures to attract passengers. Of course, it is then important for the concessionaire to follow through on those proposals to meet its business plan and deliver passenger benefits. In addition, the concession winner will often have a strong incentive to grow traffic to the level projected in the bid/contract and therefore has an incentive to invest in capacity and/or quality to attract airlines and passengers.

- Airports often compete to provide operations at other airports. This type of competition enables the spread of best practice across different airports and therefore lowers costs to passengers at the airport letting the management contract for services. In turn, other airports within the airport group providing those contracted-out operations are likely to benefit by exposure to a broader range of operating processes, enabling greater innovation and lowering costs/improving service quality.

- This competition between airports for corporate control is likely to affect all airports, whether they are active in this market or not, by increasing the standards of efficiency achievable where this market is active. As airports (and their owners) which are not active in this market for corporate control can compare themselves to airports which are, this competition for corporate control is likely to "raise all boats".

These competitive mechanisms are illustrated in the following figure.

FIGURE 4 VISUALISING HOW AIRPORTS COMPETE WITH EACH OTHER



Source: adapted from Oxera report for ACI EUROPE and Frontier Economics. Oxera (2017), "The continuing development of airport competition in Europe", 15 September.

Note: blue line indicates boundary of airport competition for that mechanism.

In some circumstances there are broader competitive constraints on the aviation industry through the existence of other modes of transport offering consumer choice. Where other modes of transport (in particular high-speed rail) provide a competitive constraint, then this will further exert pressure on airports to act in a way to attract passengers.[29]

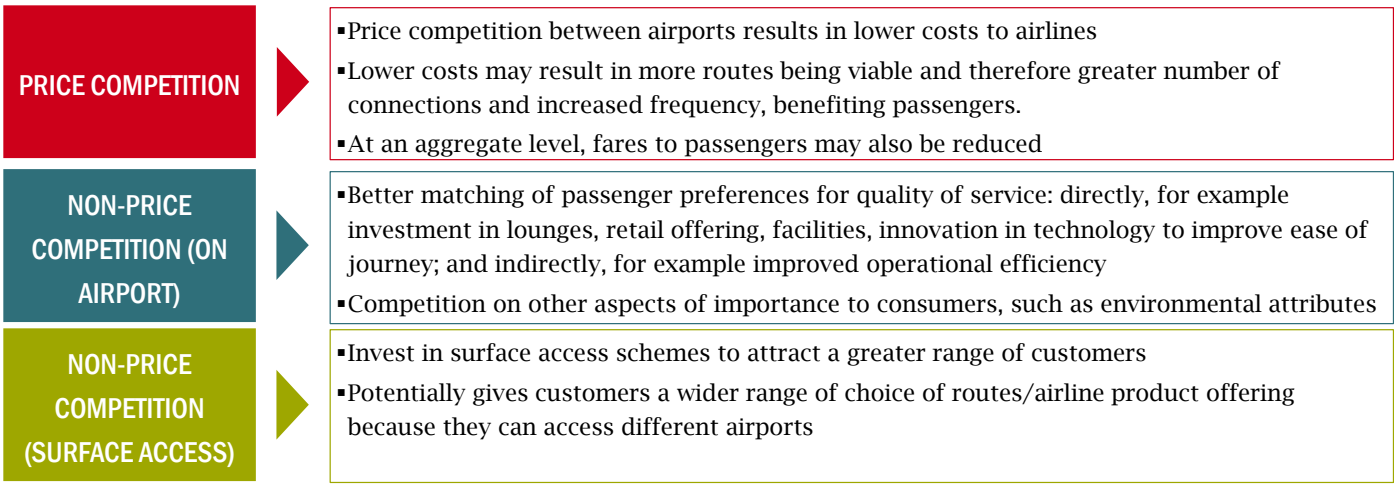
These mechanisms can overlap and were thought to be felt to different extents at different types of airports between 2010 and 2016. In subsequent sections of this report, we examine how these different facets of airport competition evolved after 2016 until the onset of the Covid-19 pandemic. However, before looking at this in more detail, it is useful to consider how airport competition affects consumers, which is the topic of the next sub-section.

2.5 HOW DOES AIRPORT COMPETITION AFFECT CONSUMERS?

Airport competition would be expected to result in airports aiming to better meet the preferences of its customers: airlines and consumers (passengers). There are several ways in which competition between airports could benefit consumers: this can occur through lower prices charged to consumers and improved non-price outcomes, which are summarised in the figure below.

[29] The debate about the role of aviation and rail is a complex one. See, for example, Eurocontrol (2021), "Think Paper #11 – Plane and train: getting the balance right" and the proposals to prevent domestic flights in France.

FIGURE 5 LINKING AIRPORT COMPETITION TO CONSUMER IMPACTS



Source: Frontier Economics.

Note: competition includes both price and non-price aspects for airlines also, in particular aiming to set charges and service quality to airlines in a way which enables airlines to optimise their asset utilisation and yield. However, this figure focuses on impacts on consumers, not on impacts on airlines.

As can be seen from this figure, airport competition can be expected to result in a greater range of airline services (and – on average – lower fares for consumers), better matching of consumer preferences on non-price aspects of product offering, and access to a broader range of airports because of investments in surface access schemes than would be the case without competition between airports. Price competition and non-price competition on airport will benefit all passengers, while surface access competition will primarily benefit origin and destination (i.e., non-transfer) passengers. The rest of this section outlines the mechanisms in more detail.

2.5.1 PRICE COMPETITION

Passengers do not directly pay airports for their use: they pay for airport facilities through passenger charges which are included within the price they pay to the airline for their flight. Airports do not therefore compete directly for passengers on the basis of price charged to passengers: instead, they compete for airline services (partly) on the basis of the charge they levy on the airline for using the airport's facilities.

Thus the most important aspect of airport competition is that price competition is not simply whether Airport A is less expensive than Airport B, but whether Airport A provides the price and conditions which allows the airline choosing between Airport A and B to offer air fares to passengers at a level which is demanded by those passengers: airport charges are therefore only one aspect of an airport's offering to airlines and airlines can be expected to take all these different aspects into account when deciding which routes to serve and where to locate their aircraft.

In many circumstances, as found in this report, airports compete to attract airlines by offering lower airport charges or allow an airline to operate more efficiently (this form of competition appears to be widespread, based on discussions with airports), this will result in lower costs (relative to a scenario in which there is not airport competition) to airlines. Assuming that there are not capacity constraints at the

airport,[30] then lower airport charges can be expected to enable airlines to operate new routes or additional capacity profitably: even if fares on existing routes and services are unchanged (as airlines will set those fares on the basis of the market conditions they face using yield management systems) this would be expected to reduce the average of fares across all routes.[31]

2.5.2 NON-PRICE COMPETITION (ON AIRPORT)

In contrast to price, passengers do directly experience non-price aspects of the airport's service offering: such as the quality, operational efficiency and cleanliness of facilities, shopping and catering opportunities, different lounge offerings, security queue times, etc. In addition to this, airlines will value both the passenger facing aspects of service quality (balancing those against the prices charged) and other aspects of the airport's facilities such as operational efficiency which reduces their own operating costs, flexibility on parking location or the availability of airbridges.

Where passengers and airlines have a choice of airports (for example, connecting passengers choosing which airport to change planes at, or passengers have a choice of airports serving their origin or destination), this means that airports have an incentive to adapt their facilities to match consumer preferences and improve service quality (balancing service quality against price impacts).

In addition to competing on customer experience, it is likely that airports compete on other aspects of their product offering which is important to consumers: one aspect which is likely to become increasingly important in the coming years is the environmental impacts of the airports – both carbon dioxide (and other greenhouse gas) emissions and other aspects such as waste (particularly plastic) management. This is likely to mean that airports increasingly invest in environmental impact reduction initiatives to attract passengers who are concerned about their environmental footprint.

2.5.3 NON-PRICE COMPETITION (SURFACE ACCESS)

Where there are multiple airports serving an area, they can compete for passengers. By improving surface access links to the airport (i.e., making it quicker and/or easier for consumers to travel to the airport), this can increase the number of potential passengers who can access the airport.

Road and rail links to airports are often under the control of other organisations, and it is therefore likely that airports would seek to promote schemes with these authorities which would benefit them, and may make contributions (either financial or other resources) to their development. However, changes in surface access are often slow to develop and deliver: with road and rail projects often taking decades between the original idea and the road or rail link becoming operational. It would therefore not be surprising if this way of airport competition benefitting consumers takes many years to become apparent..

[30] Where there are capacity constraints, for example, slot restrictions at particular airports, then the fares charged by airlines to passengers are likely to increase to "price-off" the excess demand, resulting in fares which are not directly related to the costs of operating the routes at that airport. In short, airport costs for the airline matter when the airline is making decisions about where to deploy capacity, airport charges do not matter for the yield management used by airlines to set air fares.

[31] The precise extent to which airlines pass-on costs to passengers is the subject of an extensive literature. See, for example, Malina, R. McConnachie, D. Winchester, N. Wollersheim, C. Paltsev, S. and Waitz, I.A. (2012) *The impact of the European Union Emissions Trading Scheme on US aviation*. Volume 19 p.36–41. Journal of Air Transport Management. Alternatively, see Coopmans, C. and Leishout, R. (2016) *Airline cost changes: to what extent are they passed through to the passenger?*. Volume 53 pp. 1-11. Journal of Air Transport Management.

Where this type of competition is successful, it is likely to result in consumers in a particular area having access to a wider range of routes, airlines and airport product offerings than would otherwise be the case.

2.6 THE RELATIONSHIP BETWEEN COMPETITION AND REGULATION

The previous sections have outlined how airports compete with each other, and how that competition affects consumers. In a competitive market, determination of prices and other aspects of service offering are typically left "to the market to determine", subject to the oversight of competition authorities and the decisions of public authorities on topics such as the level of tax or subsidy to provide. However, where the market is not competitive, there may be a form of economic regulation: but economic regulation is a not binary – it is not "on or off". There is a broad range of approaches which can be applied, ranging from light-touch monitoring, through to intrusive price- or revenue-cap regulation[32]. Given that the objective of economic regulation is to constrain the abuse of any market power and often to move the market to a situation which mimics the outcomes under a competitive situation, any assessment of whether it is required and what form it should take needs first of all to take account of the degree of competition that is already present.

Such an assessment also needs to take account of the direct and indirect costs of regulation, and these need to be weighed against its potential benefits in improving outcomes for consumers. The direct costs are clear: the costs of the regulator and the regulatory teams at the regulated firm. The indirect costs may include stymying the development of competition or changing the behaviour of the regulated company in ways which do not support consumers as they would in a competitive market. This could include not pricing to maximise the use of airport infrastructure and/or the development of air connectivity, which can be shown to increase consumer welfare[33].

As outlined in the European Commission's Better Regulation Guidelines, regulation should be based on an assessment of "the extent to which different options would meet their objectives, with what benefits, at what cost, with what implications for different stakeholders, and at what risk of unintended consequences"[34]. The extent to which the market is competitive bears crucially on the costs and benefits of any regulation, and therefore whether regulation is merited and what form it might take.

2.7 WHERE MIGHT INAPPROPRIATE FORMS OF REGULATION HAVE UNINTENDED CONSEQUENCES?

The previous section outlined that there is (or should be, based on economic principles) a relationship between the level of competition in a market and the extent, and form, of economic regulation applied in that market. In this section, we briefly explore some potential unintended consequences of overly intrusive regulation.

We consider four potential unintended consequences of overly intrusive regulation:

- The regulator prevents commercial interactions between airport and airline: if airlines have substantial buyer power and could thus negotiate commercially with the airport, but the regulator "second guesses" what the outcomes of these negotiations would be, then this could prevent competitive dynamics affecting the behaviour of airlines and airports as they focus more on

[32] The latter is relatively unusual and is usually reserved for utilities such as rail, water or power networks

[33] See, for example, Frontier Economics (2020) *Price differentiation in the context of airports: A report prepared for ACI EUROPE.*

[34] European Commission (2021) *Better Regulation Guidelines.* p. 32.

influencing the regulator than on reaching commercial deals with each other. Ultimately, this could result in deals not being made (and the airport having lower passenger volumes and therefore higher charges to the remaining passengers) or investments not being made. This process of "second guessing outcomes" may also prevent airports and airlines co-operating where there are aspects of common interest such as generating non-aeronautical revenue.

- Management distraction. Management spends more time addressing issues of economic regulation than focusing on developing the airport business.

- Regulation prevents effective airport-airport competition: by focussing on the costs of one or both airports, and enforcing a particular approach to charging, economic regulation may prevent the emergence of a competitive market.[35]

Well designed and appropriate economic regulation can have significant benefits for consumers: the key issue here is not that all regulation is inappropriate, but that the extent of competition may render economic regulation unnecessary or significantly influence the form it should take The potential unintended consequences of economic regulation should also be considered: regulation, if required, should be adjusted to the context in which it is operating to maximise the chances of the market in question delivering what consumers want. That means paying particular attention to the extent of competition both in considering whether regulation is merited and what form it might take.

The next section outlines market developments to 2019, to inform an understanding of the extent and intensity of airport competition.

[35] The primary way of dealing with market power is different in different sectors: for example, utility regulation often aims to ensure that utilities are provided in an efficient way by a monopoly provider, while telecommunications regulation often aims to foster a competitive market where this is appropriate.

3 MARKET DEVELOPMENTS UP TO 2019

SUMMARY

Comparing recent changes in the European aviation market to trends between 2010 and 2016, a number of trends are notable:

- Growth has continued to be mainly driven by LCCs: LCCs added 51% of all seats from 2016 to 2019 across Europe.
- The leisure market is still growing: an increasing share of passengers are travelling for leisure and VFR as opposed to business. For example, in Germany, the share of air passengers going on holiday increased from 39% to 40% and the share of passengers visiting family and relatives increased from 26% to 28% from 2014 to 2019.
- Online travel agents have continued to grow substantially over this period, enabling consumers to compare flights and travel options from different airports in a straightforward way.

These market trends are a continuation of the trends identified in previous reports. As these trends were found to have driven competition between airports, their continuation suggests that the competitive pressure experienced by airports in Europe is likely to have been sustained or increased.

This section outlines how the aviation market has changed since the 2017 study, which was based on data up to and including 2016[36]. Where available, we provide a time series of data since 2010 to provide historical context to the analysis of developments between 2016 and 2019.

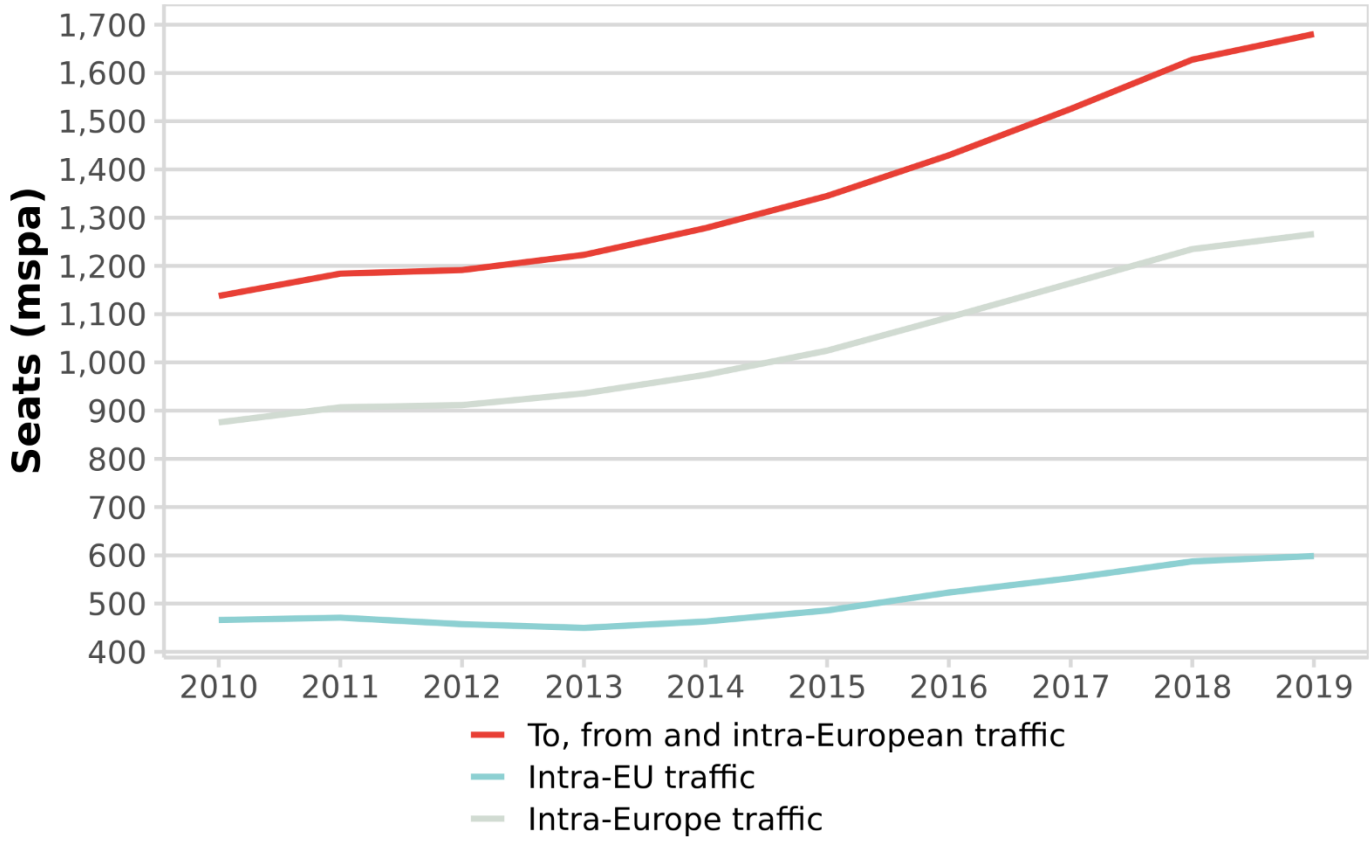
3.1 GROWTH IN THE EUROPEAN AVIATION MARKET SLOWED IN 2019

The aviation market in Europe continued to grow from 2016 to 2019[37]. Figure 6 shows that market growth was particularly high post-2013. Between 2013 and 2019, the market (to, from and within Europe) grew by 37%.

[36] Oxera, 2017. *The continuing development of airport competition in Europe*.

[37] This is measured by the number of seats per annum (million).

FIGURE 6 MARKET GROWTH FLATTENED AFTER 2018

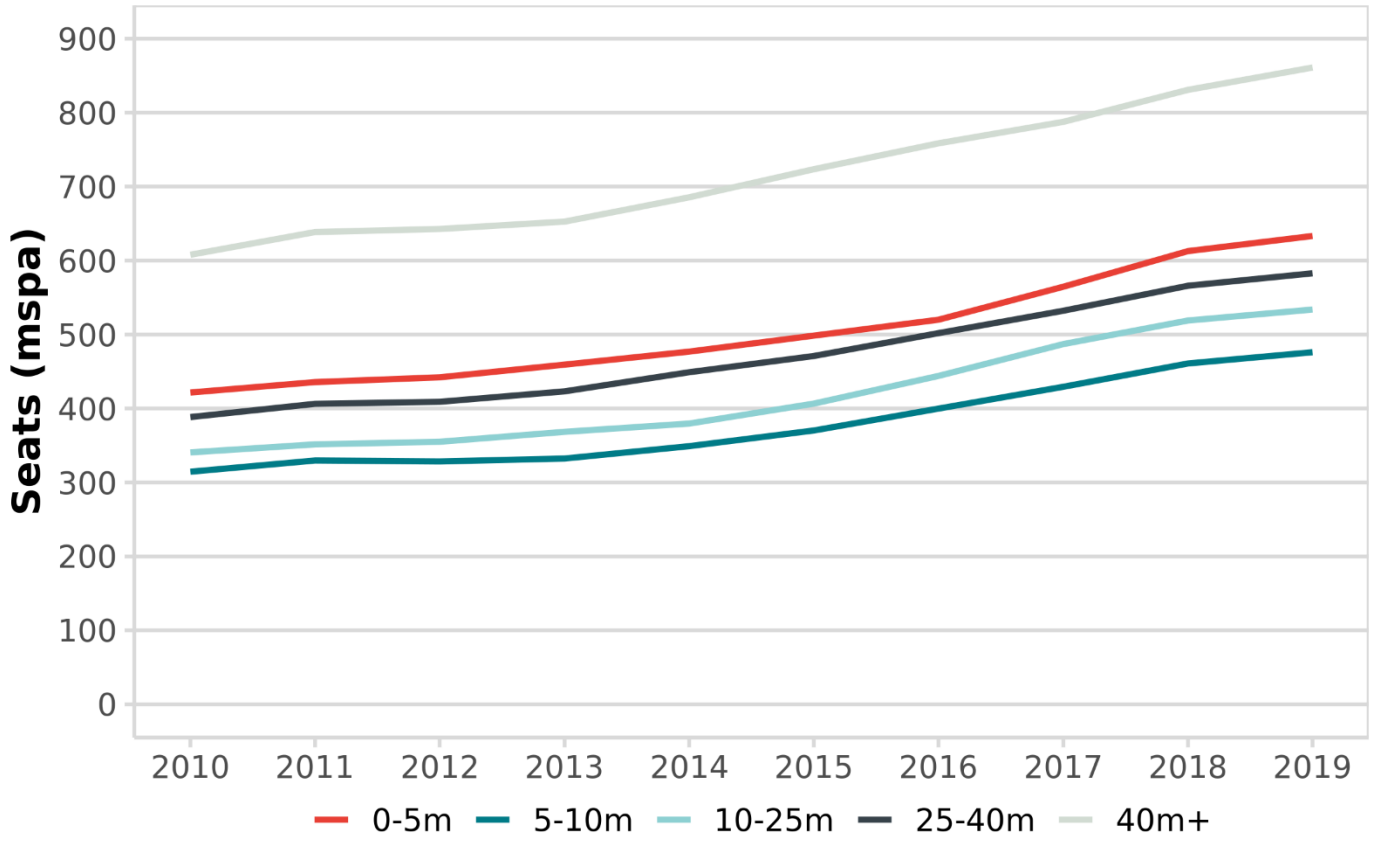


Source: Frontier analysis of OAG data

Note: This chart shows the growth in total seats (million seats per annum) from 2010 to 2019. Europe is defined as every country with at least one airport which is a member of ACI EUROPE (a complete list is in Annex A.1). Monaco is excluded as it only has a heliport. Intra-Europe is defined as routes with the origin and destination within Europe, as per definition above, EU is defined as EU members, as of March 2022. Intra-EU is defined as routes with the origin and destination within the EU.

We observe the same growth pattern across airports of all sizes: a steep increase up until 2018, and a slight levelling off in 2019 (Figure 7). Across airport size categories, small and medium-sized airports (0-25 million seats per annum mspa) grew the most from 2016 to 2019 (around 20%). Larger airports grew more slowly over the same period: largest (40 mspa+) airports grew by 13%, and 25-40 mspa airports grew by 16%. In contrast, from 2010 to 2016, airports from 10-25mspa (30%) and 25-40mspa (29%) grew the fastest, followed by 5-10mspa (25%), over 40mspa (24%) and 0-5mspa (23%).

FIGURE 7 MEDIUM-SIZED AIRPORTS (10-25MSPA) ADDED THE MOST CAPACITY OVER THE PERIOD

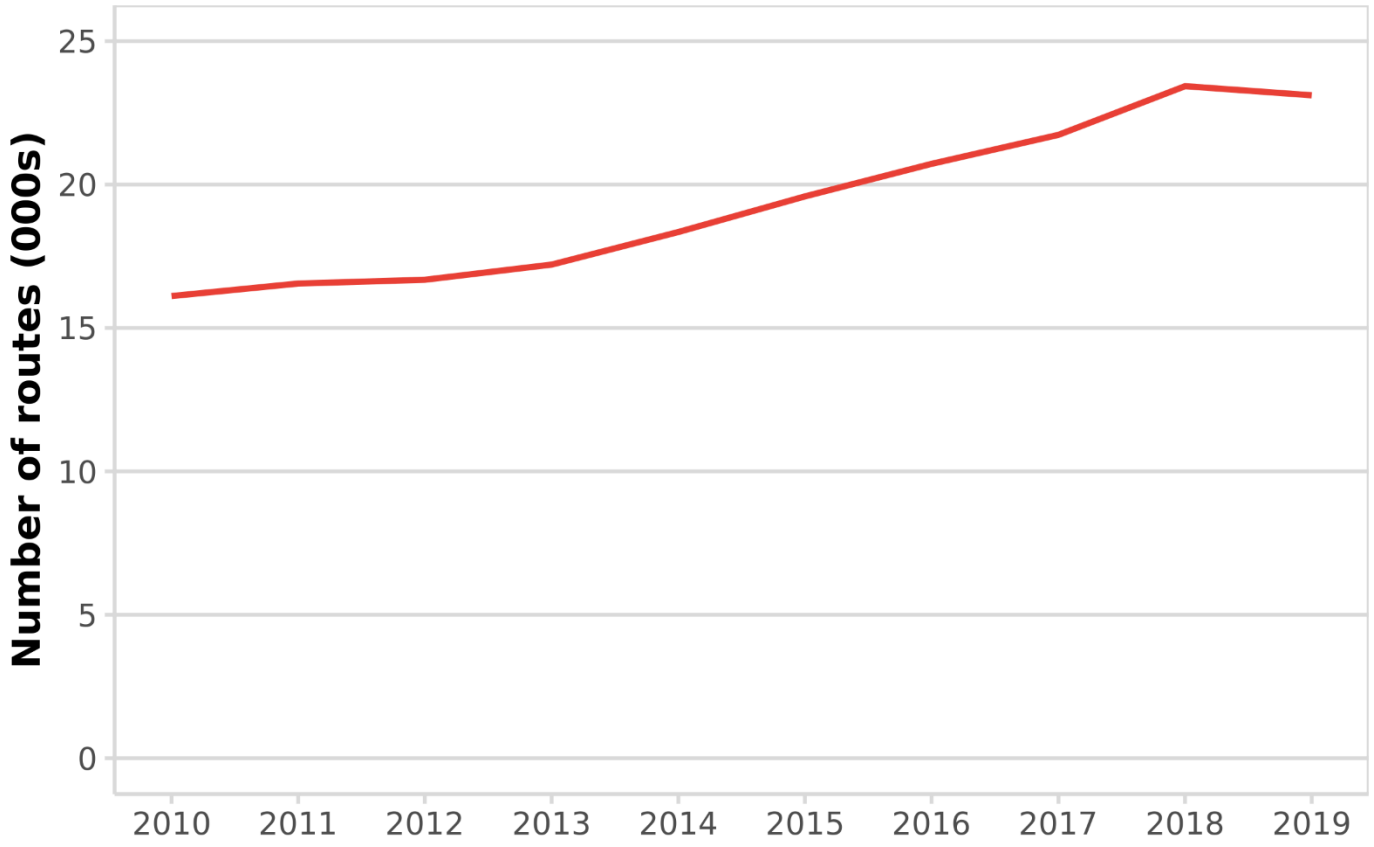


Source: Frontier analysis of OAG data

Note: This chart shows the total seats (million seats per annum) from 2010 to 2019, by airport size. Airport size is defined using the total number of seats arriving and departing each airport in 2019.

Growth was not simply confined to aggregate seats flown: from 2010 to 2019, the number of total unique routes increased by 43%; where one unique route is defined as a service by a unique airline between a unique origin and destination). Similar to wider trends, this growth levelled-off in 2019 at around 24,000 (Figure 8).

FIGURE 8 THE NUMBER OF UNIQUE ROUTES INCREASED BETWEEN 2010 AND 2018



Source: OAG data

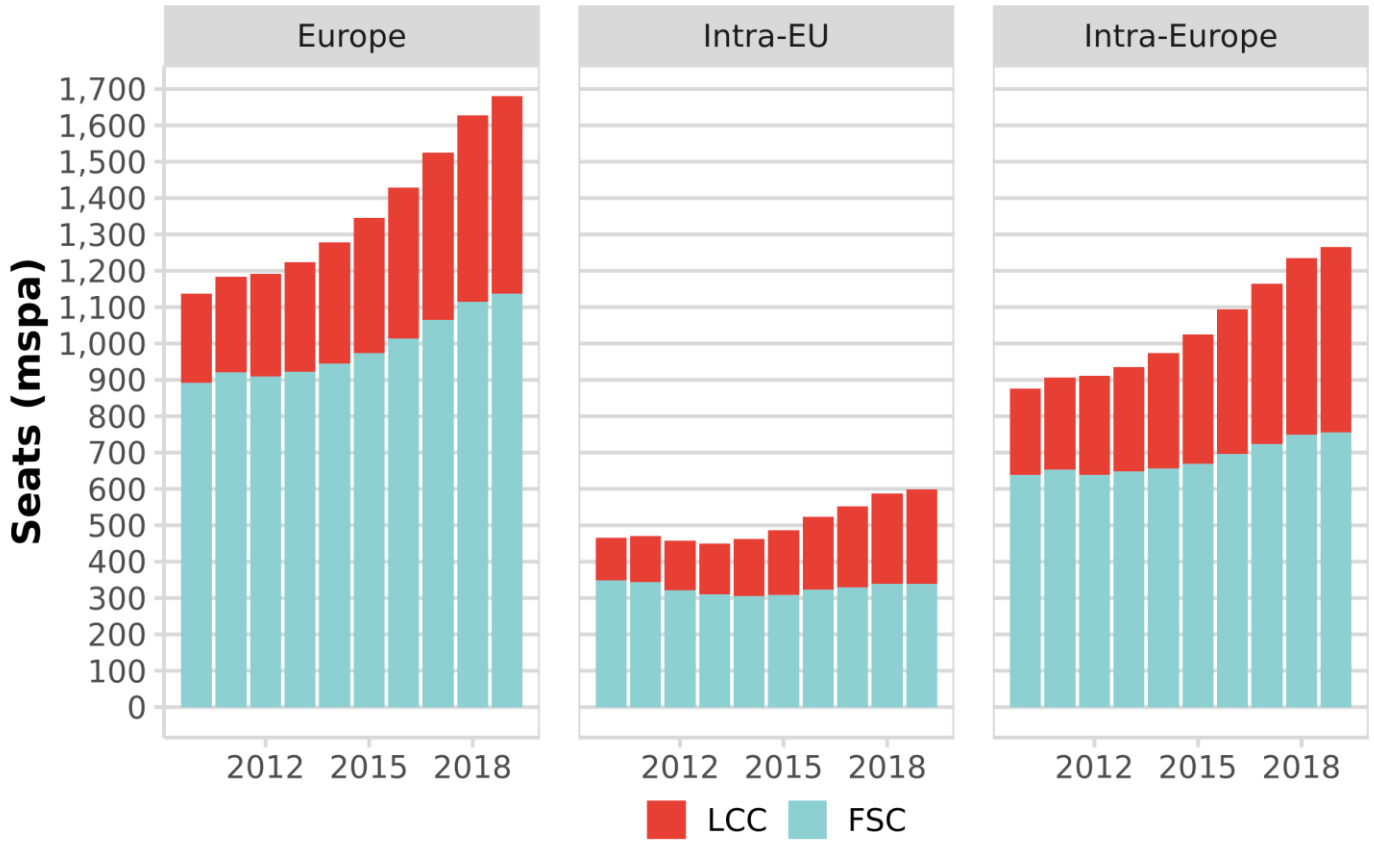
Note This chart shows the number of unique routes (000s) to, from, or within Europe from 2010 to 2019. One route is defined as a service by a unique airline between a unique origin and destination. Europe is defined as every country with at least one airport which is a member of ACI EUROPE. Monaco is excluded as it only has a heliport.

3.2 MARKET GROWTH FROM 2016 TO 2019 CAME FROM LCCS

Within the growth outlined in the previous section, LCCs were the major driver of change over time. Figure 9 shows that the continual increase in seats between 2016 and 2019 is mainly due to the increase in total seats from LCCs in Europe and Intra-Europe (defined as routes with the origin and destination within Europe). This is a continuation of the trend pre-2016.

However, while Middle Eastern airlines were major drivers of growth between 2010 and 2017, the share of Middle Eastern airlines capacity began to level-off towards the end of the decade, at just below 10% of total seats in Europe in 2019.

FIGURE 9 LOW-COST CARRIERS HAD THE GREATEST INCREASE IN CAPACITY FROM 2016 TO 2019

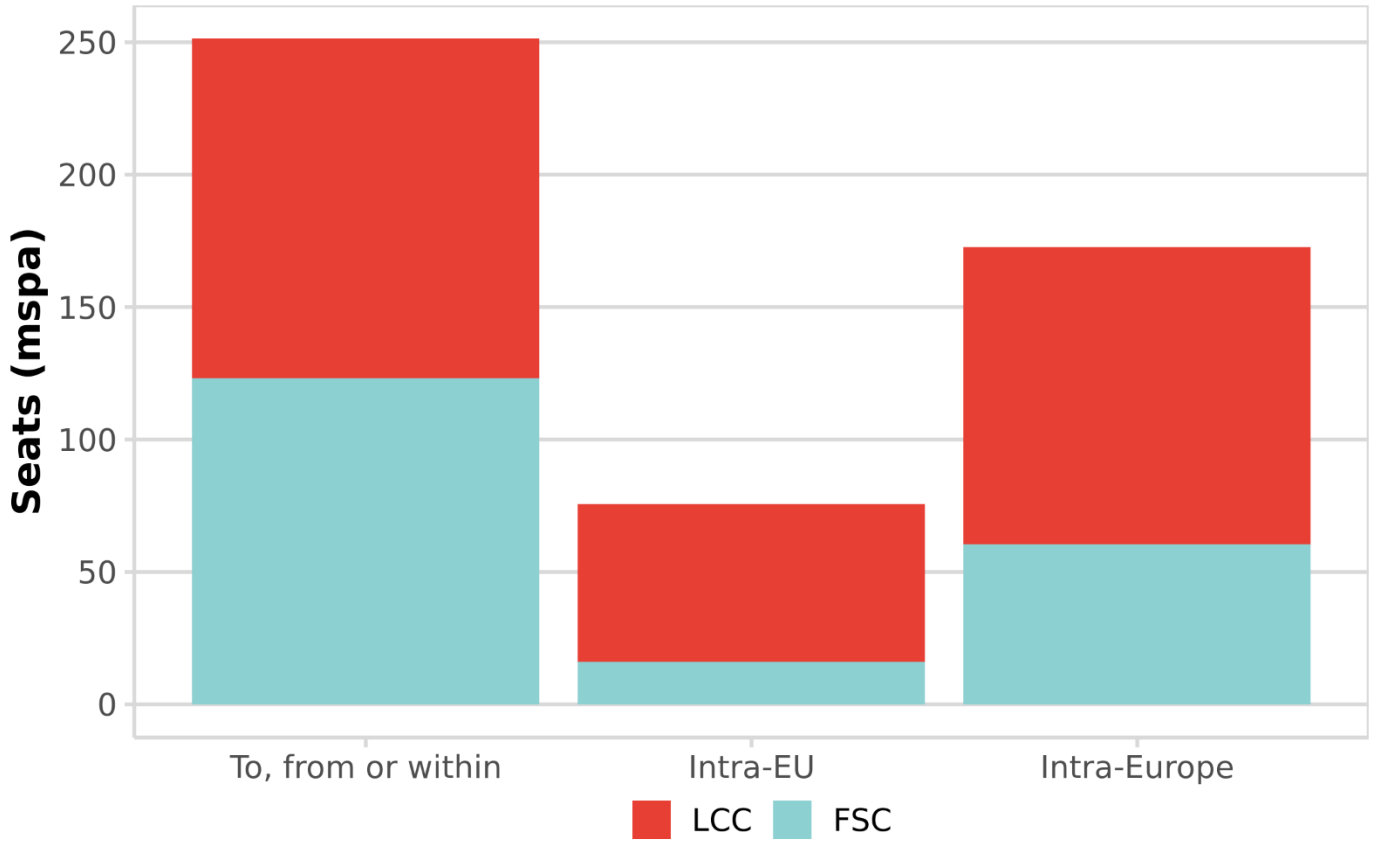


Source: Frontier analysis of OAG data

Note: This chart shows the total seats (million seats per annum) from 2010 to 2019, by airline type. LCC and FSC are classified according to OAG definitions. Europe is defined as every country with at least one airport which is a member of ACI EUROPE. Monaco is excluded as it only has a heliport. Intra-Europe is defined as routes with the origin and destination within Europe, as per the definition above, EU is defined as EU members as of March 2022. Intra-EU is defined as routes with the origin and destination within the EU.

Figure 10 shows the overall share of seat change from 2016 to 2019; it shows that almost all of the changes in seats for intra-EU flights can be attributed to LCCs. And a majority (51%) of the growth in Europe (to, from and within) is due to LCCs.

FIGURE 10 LCCS ADDED 51% OF ALL SEATS FROM 2016 TO 2019 ACROSS EUROPE

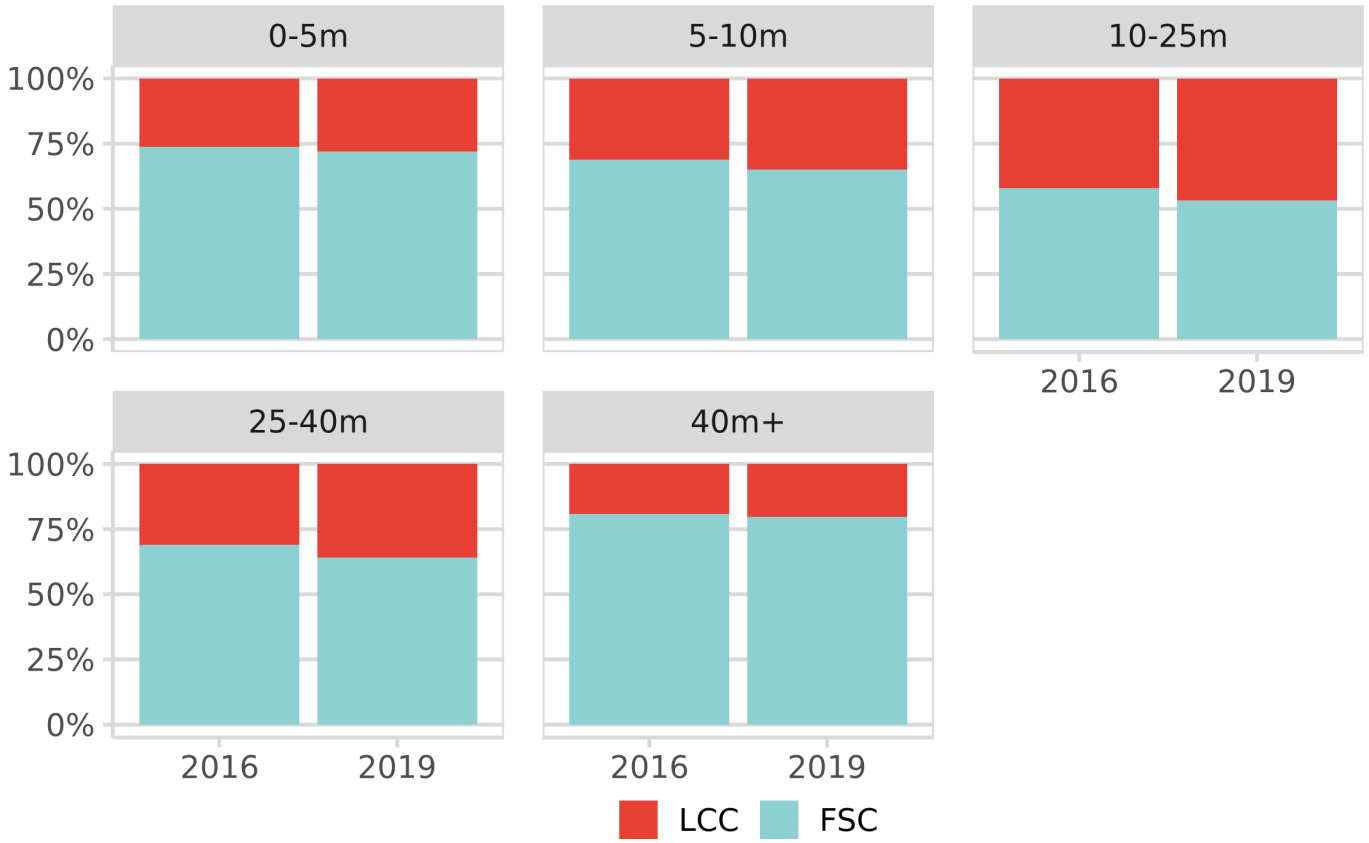


Source: Frontier analysis of OAG data

Note: This chart shows the share of seat change (millions of seats per annum) from 2016 to 2019, by airline type. LCC and FSC are classified according to OAG definitions. Europe is defined as every country with at least one airport which is a member of ACI EUROPE. Monaco is excluded as it only has a heliport. Intra-Europe is defined as routes with the origin and destination within Europe, as per definition above, EU is defined as EU members, as of March 2022. Intra-EU is defined as routes with the origin and destination within the EU.

The previous charts have established that LCCs were the main airlines adding capacity in the European aviation market between 2016 and 2019. Figure 11 breaks this down further to show the source of growth from 2016 to 2019 by airport size and airline type. Consistent with wider market trends, FSCs remain the most prominent in the composition of seats, however LCCs have grown from 2016 to 2019 for all airport sizes. As noted in section 3, there has been a considerable blurring of the boundaries of these categories over time.

FIGURE 11 THE PROPORTION OF CAPACITY ACCOUNTED FOR BY LCCS HAS INCREASED FOR AIRPORTS OF ALL SIZES BETWEEN 2016 AND 2019

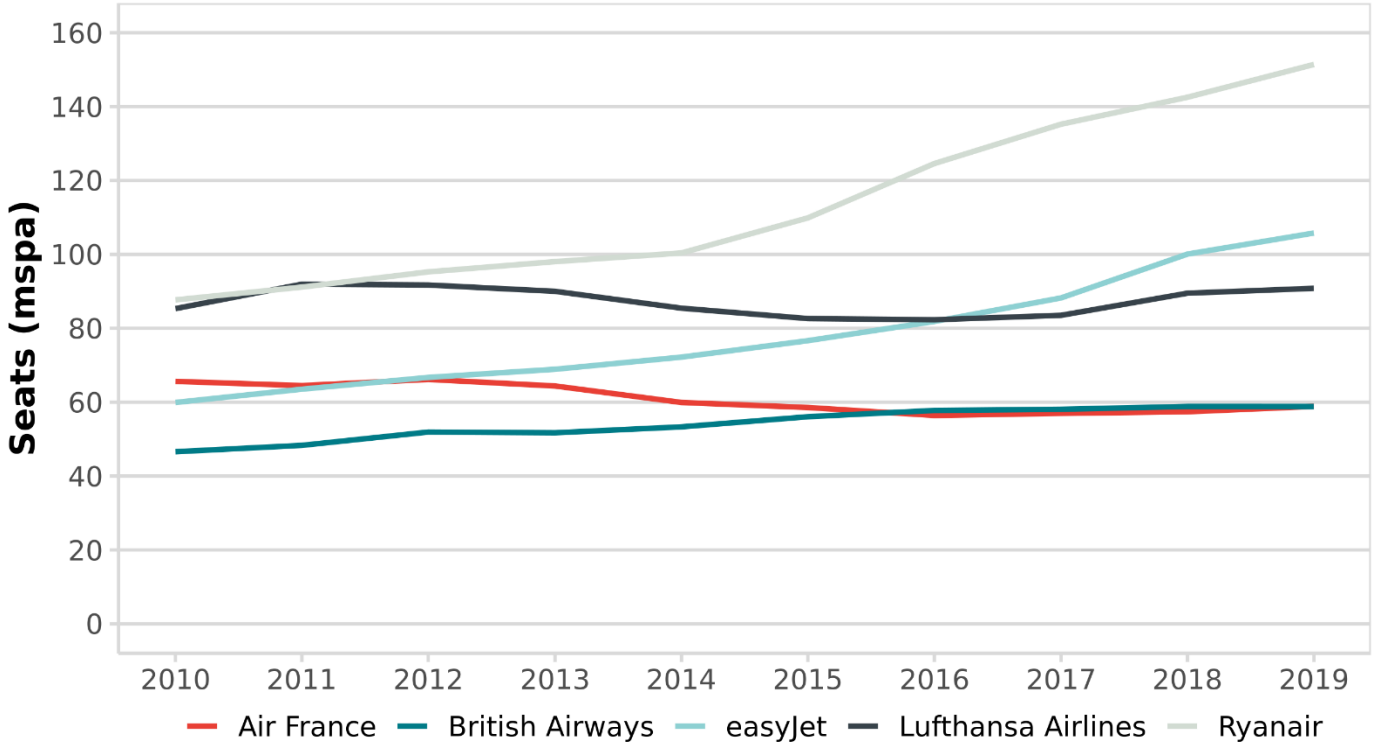


Source: Frontier analysis of OAG data

Note: This chart shows the composition of seats in 2016 and 2019, by airline type and airport size. LCC and FSC are classified according to OAG definitions. Airport size defined using total number of seats arriving and departing each airport in 2019.

LCC growth, relative to FSCs, is further emphasised when we examine the growth of the airlines who were Europe's largest in 2010. Of the five largest airlines in 2010, by 2019, the top two are LCCs (shown in Figure 12). Of these airlines, easyJet's total seats grew the most from 2016 to 2019 (just under 30%), overtaking Lufthansa in 2016. Ryanair's total seats also grew considerably in the same time period, by 22%. On the other hand, the three FSCs in the top five in 2010 - Lufthansa, British Airways and Air France – stayed fairly constant, in seat capacity, over the period.

FIGURE 12 COMPARING EUROPE'S LARGEST AIRLINES SHOWS LCCS GROWING FASTER THAN FSCS

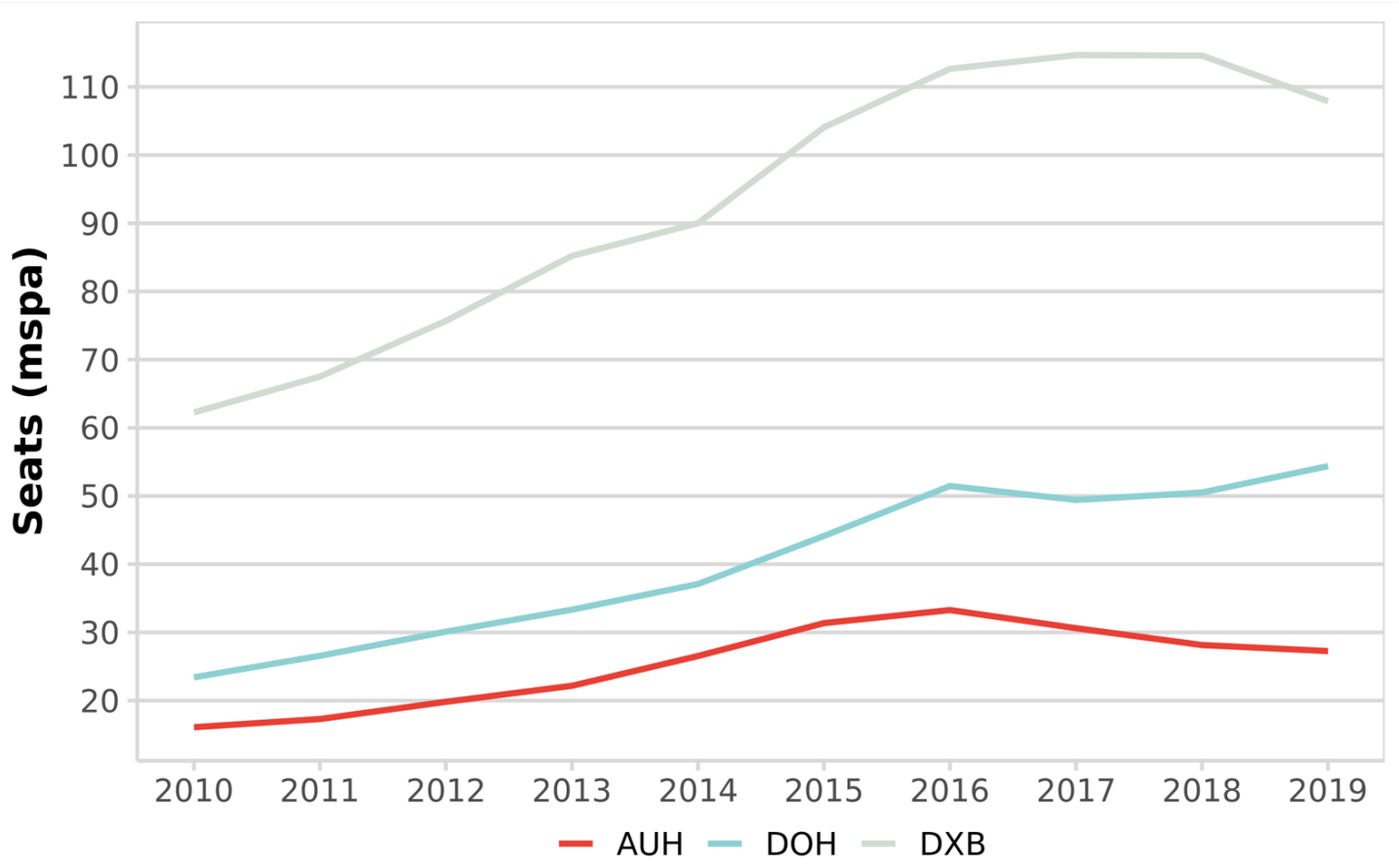


Source: Frontier analysis of OAG data

Note: This chart shows the total seats (million seats per annum) for selected airlines from 2010 to 2019. The airlines selected are the top 5 airlines in terms of capacity as of 2010 to/from/within Europe. In order, they are Ryanair (88m), Lufthansa (85m), Air France (66m), easyJet (60m) and British Airways (47m). As of 2019, the top 5 airlines are Ryanair, easyJet, Turkish Airlines, Lufthansa, and Air France.

From 2010 to 2016, Middle East 'super connector' airlines were an increasingly important contributor to market growth. Correspondingly, traffic to or from the base airports of these airlines grew. Post-2016, this pattern remains, with Istanbul and Doha having more than twice the number of seats in 2019 as in 2010. However, as shown in Figure 13, Middle East airports have grown more slowly than previously and only contributed significantly to growth for the largest airports in Europe, relative to the contribution of LCCs. From 2016, Figure 13 shows that the growth of these airports started to level off or even decrease in the case of Abu Dhabi and Dubai in the second half of the decade. However, in 2019 they accounted for around double the number of seats compared with 2010.

FIGURE 13 THE TREND FOR INCREASING MIDDLE EAST TRAFFIC LEVELLED OFF AFTER 2016



Source: Frontier analysis of OAG data

Note: This chart shows the total seats (millions of seats per annum) to/from Middle Eastern airports, from 2010 to 2019. Airports shown are Abu Dhabi, Doha, and Dubai International.

3.3 GROWTH IN THE LEISURE MARKET

The trend of increasing leisure travel has continued post-2016 (Table 4). For example, in Norway, the share of air passengers going on holiday increased from 79% to 81% between 2016 and 2019. For Germany, the share of air passengers going on holiday increased from 39% to 40% and the share of passengers visiting family and relatives increased from 26% to 28% from 2014 to 2019.

TABLE 4 SEVERAL COUNTRIES SAW A REDUCTION IN BUSINESS TRAVEL

MARKET	PERIOD	HOLIDAY SHARE	VFR SHARE	BUSINESS SHARE
Germany	2014 to 2019	39% to 40%	26% to 28%	35% to 32%
UK[1]	2015 to 2019	40% to 42%	34% to 36%	20% to 19%
Norway	2016 to 2019	Holiday share increased from 79% to 81%		21% to 19%
Netherlands[2]	2015 to 2017	Leisure and VFR joint share still 66%		34% to 32%

Source: ADV (2021), 'Airport Travel Survey 2018' and 'Airport Travel Survey 2015'; UK Department for Transport, 'Purpose of Travel at selected UK airports'; Statistics Norway, Travel Survey; Schiphol Group, 'Facts and Figures 2017' and 'Facts and Figures 2015'

Note: [1]UK is based on London Heathrow, London Gatwick, Manchester, London Stansted and London Luton airports; 2015 UK data included 7% of passengers identifying as 'Other', whereas 2019 data includes only 3% 'Other'. [2]Netherlands data is based on Amsterdam Schiphol Airport only; 2015 Schiphol Airport survey split passengers only by "Leisure" or "Business", whereas the 2017 survey splits passengers further by "VFR" and "Other", hence the second set of figures do not add to 100%.

The implications of this continued increase in the leisure market are explored in later sections.

3.4 DEVELOPMENTS IN ONLINE TRAVEL MARKET

The online travel market has continued to grow in the years 2016 to 2019. The global online travel agent market reached a value of just under $744.7 billion in 2019, with a compound annual growth rate of 7.9% since 2015[38]. In 2019, Skyscanner, a leader in the sector, hit a record 100 million monthly users, a doubling since 2015[39].

As passengers' use of Online Travel Agents (OTAs) continues to grow, this means that more passengers are able to compare air fares between airlines easily. In turn, this means that passengers will also be able to compare travel options from different airports. Also, of note when thinking about the category of "footloose" passengers is the addition by some OTAs to provide options to search across multiple destinations (for example, Skyscanner enables users to search "everywhere").

Finally, OTAs have introduced new flight search options and suggestions of other airports from which travellers can fly by first arriving at the airport by train or coach/bus. For example, when searching for flights from Brussels to another destination, Kayak.fr will suggest taking a BlaBlaBus to Lille airport. This enables passengers to compare a wider range of airports to make their journeys than they may have previously considered.

3.5 CONCLUSIONS

This section has outlined, at a high level, that many of the market trends identified in previous reports continued from 2016 to 2019. This indicates that the competitive pressures identified in previous reports have been sustained or increased. The next section considers the implications of these trends for competition between airports in more detail.

[38] Globe Newswire (2020) *Global $595.8 Billion Online Travel Agent Market Analysis*. Available at: https://www.globenewswire.com/news-release/2020/11/18/2128883/0/en/Global-595-8-Billion-Online-Travel-Agent-Market-Analysis-Opportunities-and-Strategies-2015-2019-2020-2030.html (Accessed 26 July 2022).

[39] PR Newswire (2019) *Skyscanner Hits 100M Monthly Users And Reveals New Mission For Travelers*. Available at: https://www.prnewswire.com/news-releases/skyscanner-hits-100m-monthly-users-and-reveals-new-mission-for-travelers-300924031.html (Accessed 26 July 2022).

SUMMARY

As outlined earlier, this study examines four aspects of airport competition in Europe:

- Competition for airline services;
- Competition for connecting passengers;
- Competition for passengers in the local area;
- Competition in the market for corporate control.

COMPETITION FOR AIRLINE SERVICES

Changes in capacity shown by annual route churn are an indicator of the presence of competition for airline services: if airlines can move capacity between routes this creates a credible threat of moving capacity in the future, and with it buyer power on the part of airlines in negotiations with airports. However, this indicator is likely to only demonstrate the "tip of the iceberg" as a credible threat of moving capacity can be used to negotiate over terms for routes which remain apparently unchanged at airports.

Our analysis of airline schedules shows:

- Route openings and closures remained stable at a high level from 2016 to 2019, fluctuating between 20% and 25% of routes.
- The movement of capacity on existing routes has a greater impact on total seats than the closing and opening of routes; of all routes neither closed nor opened, over 55% saw a change of more than 10% in capacity in a given year. While this capacity volatility has been decreasing over time, it remains high. This shows that airports, in competing to retain existing routes, are also competing on the scale of those routes; strengthening their incentives to compete to retain (or enhance) capacity on existing routes as well as for new routes.
- The largest LCCs continue to have a greater level of route churn than the largest FSCs. New routes accounted for 10% of all routes each year in the FSC's networks, demonstrating that airlines of all types exhibit flexibility in their networks. In addition to this, the proportion of leisure passengers is increasing over time. Since leisure passengers are often more price sensitive (and location indeterminate) than passengers travelling for business, airlines have more incentive and freedom to move services and will negotiate with airports accordingly. This results in airports competing for airlines which are likely to be less loyal to specific routes and airports.
- Competition for spokes to hubs in the Middle East is still an important facet of airport competition.

This statistical evidence is consistent with public information from airlines on using the internationally mobile nature of their assets (aircraft) to extract best value from airports. This applies to LCCs but also FSCs. An example from Lufthansa Group shows how the use of multiple hubs drives competition between airports through being able to reallocate capacity between those hub airports. It is also

consistent with how airports are responding to this competition, for example by increasing budgets for route development and attending routes development conferences.

COMPETITION FOR CONNECTING PASSENGERS

There is a high level of competition for connecting flights in Europe due to increased direct flights and connections to hubs in the Middle East (above and beyond the competition with other European hubs). There were several developments in competition for connections between 2016 and 2019:

- Growth in connecting flights from European and most Middle East hubs began to level off.
- Istanbul Airport maintained a high-level of growth, despite pressures from its European peers and also from the Middle East hubs.
- The level of competition between European hubs, and between European and Middle Eastern hubs remained high, with most of the analysed European hubs having at least 20% of connecting flights competing with hubs in the Middle East in 2019[40].
- Hub bypass remained important, with some airports seeing an upward trend in the proportion of connections that have direct flights.

In this area also, there is evidence from airlines that they are proactively seeking to increase competition between hubs. An example is from IAG on its purchase of Air Europa that the transaction would "transform IAG's Madrid hub into a true rival to Europe's big four hubs: Amsterdam, Frankfurt, London Heathrow and Paris Charles De Gaulle."[41]

COMPETITION FOR PASSENGERS IN THE LOCAL AREA

Local competition has remained broadly constant across all airport sizes since 2016, with approximately 20% of routes having competition from at least one other local airport, a figure which is higher for very small (<5mspa) airports.

COMPETITION IN THE MARKET FOR CORPORATE CONTROL

Analysis of data on the market for corporate control shows that there is a trend towards increasing numbers of (increasingly highly valued) transactions over time, despite substantial year-on-year volatility. This is consistent with increased competition between airport groups and investors active in this market. This reflects a growing and competitive global market for corporate control of airports.

Competition in this market for corporate control can take a number of forms: competition for acquisition, competition for concessions, competition for management contracts of parts of airports. These mechanisms of competition reinforce the other ways in which airports compete as airport managers and owners work to gain (or maintain) traffic volumes and good reputations, in order to be invited to bid for future opportunities. In addition, by disseminating innovation and best practice across the industry and "raising the bar" across airports involved in this market for corporate control, this mechanism affects all airports, regardless of ownership structure.

[40] The exception is Madrid because of the westward bias in traffic volumes from this airport.

[41] IAG (2019) *Agreement for the acquisition of Air Europa for €1 billion.* Available at: https://www.iairgroup.com/en/newsroom/press-releases/newsroom-listing/2019/iag-air-europa (Accessed 26 July 2022).

MARKET OUTCOMES

In addition to examining the evidence on indicators of competition, we have also examined data on market outcomes. Analysis of data on aeronautical revenue per passenger and service quality (as measured by customer satisfaction survey responses) shows that:[42]

- For most groups of airports, aeronautical revenue per passenger has been flat in real terms between 2016 and 2019. The exception is the smallest airports, where aeronautical revenues per passenger decreased by 17% over this period.
- Across all airport size categories, customer satisfaction improved.

These findings are consistent with the existence of material competitive constraints on airports, which constrain pricing behaviour and promote airports acting to provide products and services that passengers want.

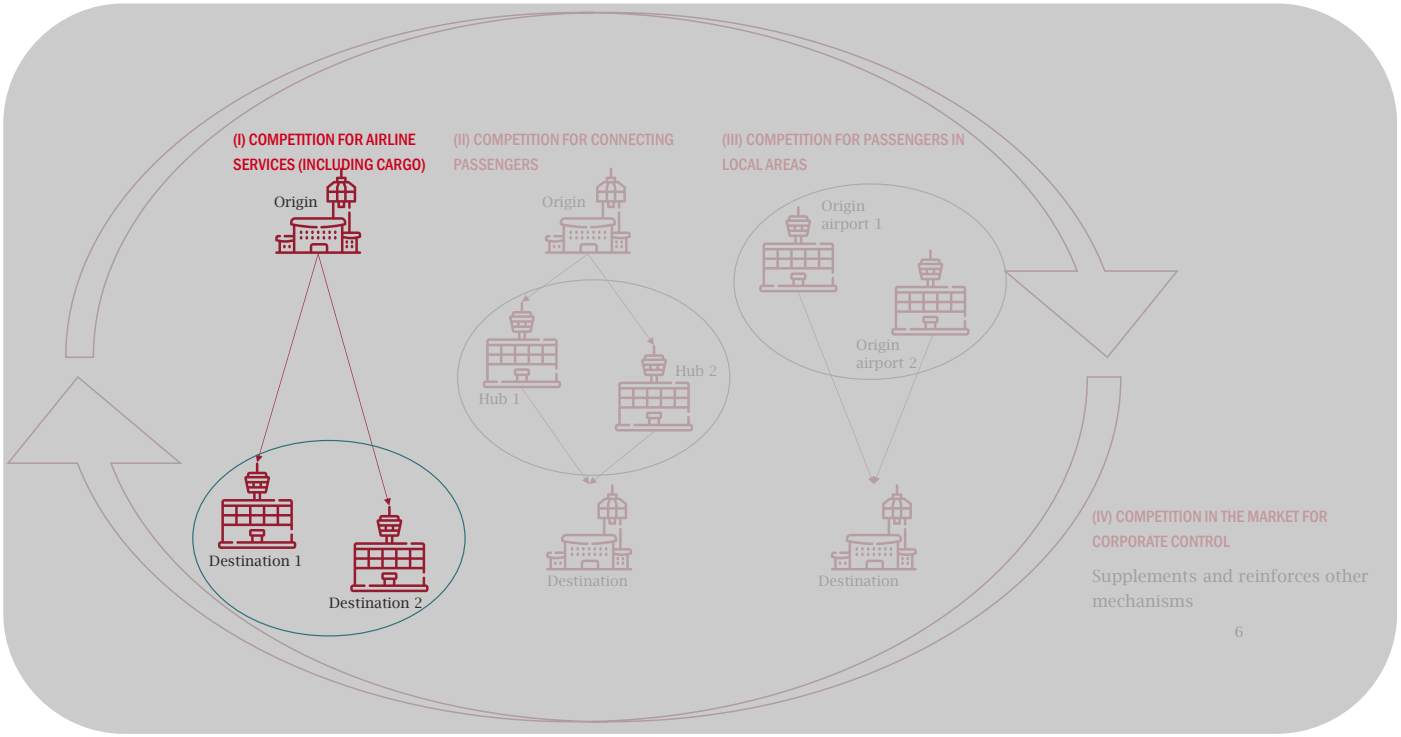
As set out in the conceptual framework in section 2, airports compete in a number of different ways: (i) for airline services, (ii) for connecting passengers, (iii) for passengers in the local area to the airport, and (iv) in the market for corporate control. In this section, we explore the data in view of this framework: competition for airline services (section 4.1), for connecting passengers (section 4.2), for local passengers (section 4.3) and for corporate control (section 4.4). We also examine market outcomes (section 4.5) as a result of the level of competition in the airport market.

4.1 COMPETITION FOR AIRLINES' SERVICES ON NEW AND EXISTING ROUTES

Section 3 outlined the trends in the European aviation market, particularly from 2016 to 2019. In the following sections, we outline what these trends mean for airport competition. Following the framework set out in section 2, we begin with the competition between airports for airline services. For ease of reference, the figure below visually represents this aspect of airport competition.

[42] The largest airports in Europe are subject to economic regulation which controls the prices and quality offered, and these findings will reflect the outcome of regulation at those airports, as well as competition.

FIGURE 14 VISUALISING COMPETITION FOR AIRLINE SERVICES



Source: adapted from Oxera report for ACI EUROPE and Frontier Economics. Oxera (2017), "The continuing development of airport competition in Europe", 15 September.

Note: blue line indicates boundary of airport competition for that mechanism.

We build this out by focusing on route churn. Airline route churn (openings, closures, and change in capacity) are indicators of the flexibility with which airlines can move capacity: high route churn demonstrates that airlines can, and do, move their aircraft between airports. This indicates that airlines are likely to have leverage in their negotiations with airports as they have a credible threat of deploying capacity elsewhere if those negotiations are not successful. Route churn shows the proportion of routes which actually open or close. However, the amount of air traffic for which airports compete is greater than the level of route churn because airlines can use the credible threat of moving capacity in negotiations with airports about existing services– if that negotiation is successfully concluded then such services will not show up in the route churn statistics, even though credible threat of moving capacity will have been deployed.

4.1.1 ROUTE CHURN: A HIGH PROPORTION OF CAPACITY BEING MOVED, AND COMPETITION THROUGHOUT THE "STOCK" OF ROUTES

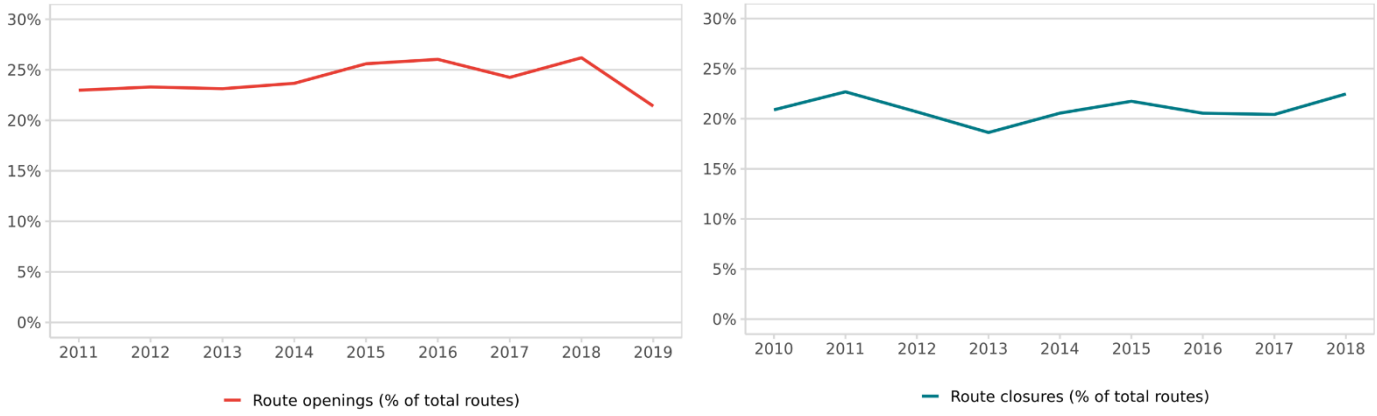
When an airline opens a new route, it is likely to choose the airport(s) that it expects to provide the greatest profitability[43]. Airports engage in negotiations with airlines to retain routes, increase passenger volumes on them as well as negotiating for new routes. While the number of routes in Europe has increased over time (Figure 8), route openings and closures (as a proportion of the number of routes) have remained stable at a high level, fluctuating between 20% and 25% (Figure 15). The level of route openings exceeded route closures every year pre-2018, reflecting continual growth in the aviation market. Airports, therefore, compete to obtain a share of this growth as well as to defend their existing position. Route

[43] Note that for home carriers, one airport end of the route is usually fixed, as this is where most aircraft will be based.

openings decreased post-2018, as route numbers began to level off. Before 2019, the average route closing rate per year was 21%, and opening per year was 24%; this decreased to an opening rate of 21% in 2019.

These rates demonstrate the continued ability of airlines to move their services between routes. However, the evidence on route churn only shows closures and openings of routes; airlines can also change the capacity of existing routes. This indicates the extent to which the airlines' credible threat of moving capacity extends to routes and services that remain at an airport. In negotiations with airports in respect of such services, airlines may negotiate on the scale of the service as well as whether it remains at the airport or not.

FIGURE 15 ROUTE CLOSURE AND OPENING RATES HAVE REMAINED STEADY OVER TIME



Source: Frontier analysis of OAG data

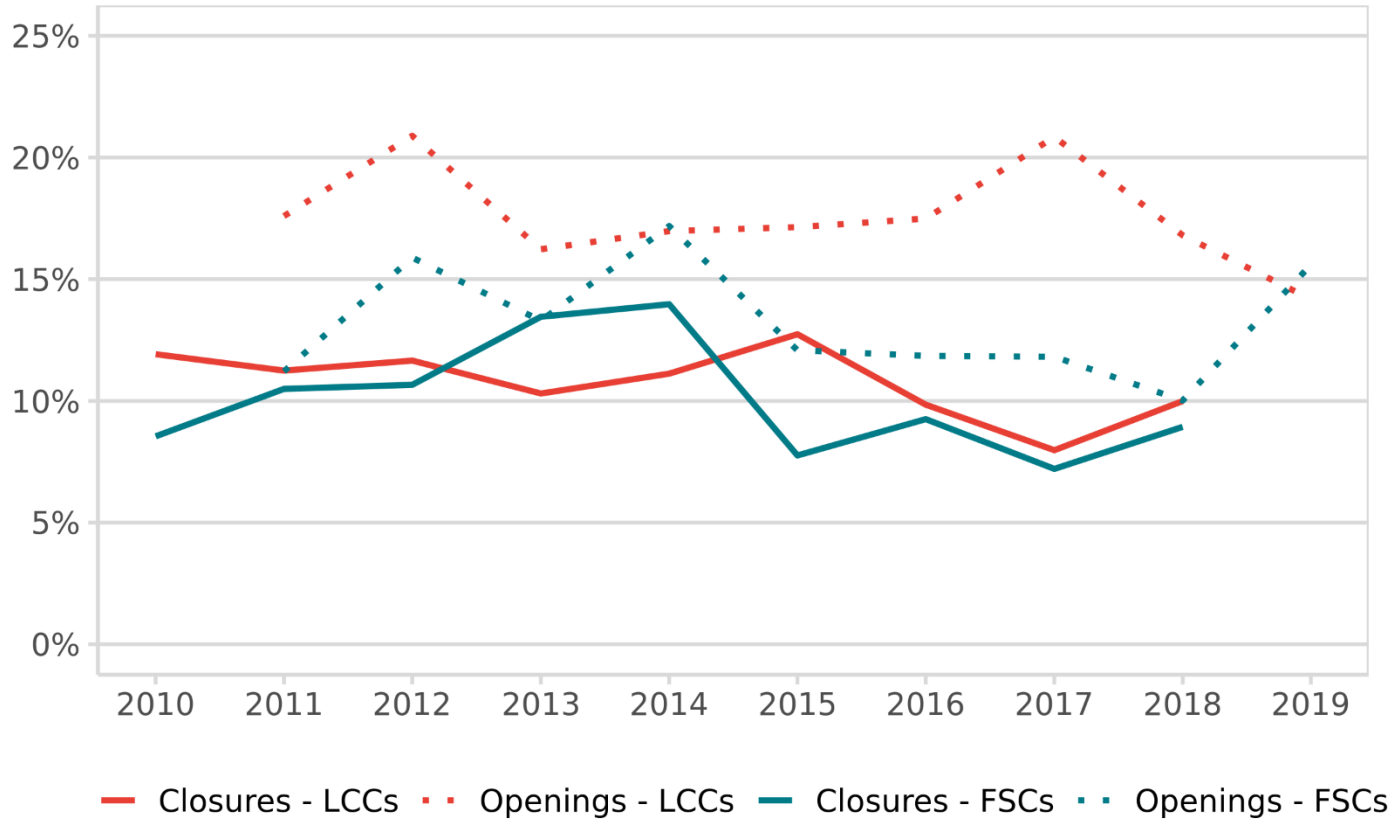
Note: This chart shows route closures and route openings, as a proportion of number of routes in a given year, for flights to, from, or within Europe from 2010 to 2019. Note that because of definition of route openings and closures, the route openings chart runs from 2011 to 2019, and route closures runs from 2010 to 2018. One route is defined as a service by a unique airline between a unique origin and destination. Europe is defined as every country with at least one airport which is a member of ACI EUROPE (a full list is in Annex 1). Monaco is excluded as it only has a heliport.

Figure 16 shows that, for most years in the period 2010 to 2019, route openings and closures for the largest LCCs are greater than for the largest FSCs. This implies that LCCs change the routes they operate more frequently than FSCs.

Moreover, as the gap between route openings and closures is greater for LCCs than for FSCs, Figure 16 also implies that route growth was greater for LCCs (which is also clear from the overall market trends in section 3.2). This emphasises the increased market share of LCCs: given the evidence that LCCs change routes more frequently than FSCs, this indicates that an increasing proportion of routes could be considered "at risk" and therefore that airports will be competing for more routes since 2016.

In addition to this, a greater share of leisure passengers means airlines have to cater to larger numbers of price-sensitive passengers. This enhances the competitive impact on airports: airports have to compete for airlines that may switch more, and for airlines who are serving passengers that are more price sensitive (on average).

FIGURE 16 ROUTE CHURN FOR LOW-COST CARRIERS IS HIGHER THAN FOR FSCS

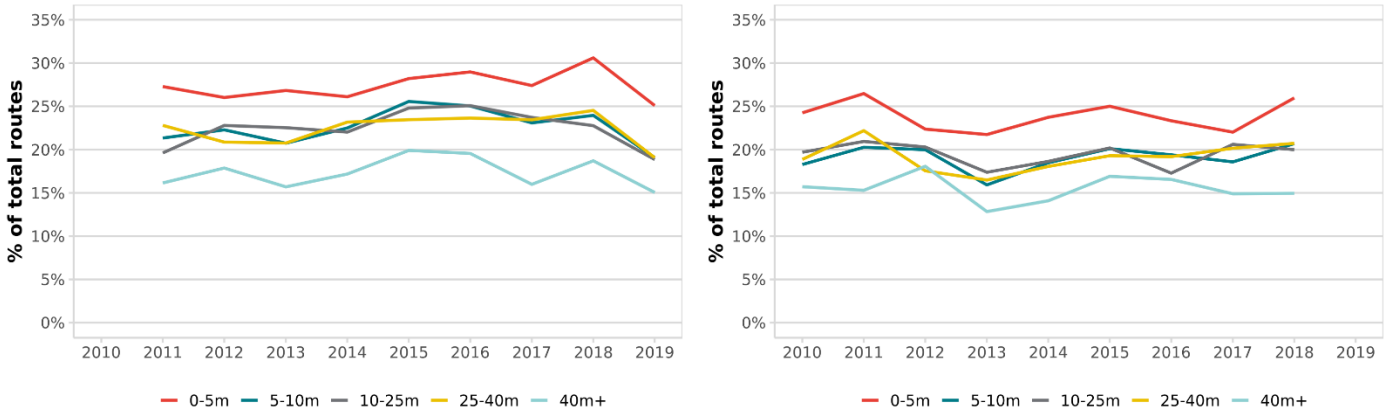


Source: Frontier analysis of OAG data and ICAO classifications.

Note: This chart shows route closures and route openings, as a proportion of number of routes in a given year, for flights to, from, or within Europe from 2010 to 2019, by FSC and LCC classification. Note that because of definition of route openings and closures, the route openings chart runs from 2011 to 2019, and route closures runs from 2010 to 2018. One route is defined as a service by a unique airline between a unique origin and destination. Europe is defined as every country with at least one airport which is a member of ACI EUROPE. Monaco is excluded as it only has a heliport. LCC and FSC classification based on ICAO list (as of June 2017). Sample restricted to top 10 European FSC and LCC airlines (based on seat numbers in 2019). FSCs: Turkish Airlines, Lufthansa German Airlines, Air France, British Airways, Aeroflot Russian Airlines, SAS Scandinavian Airlines, KLM-Royal Dutch Airlines, Pegasus Airlines, Iberia, and Alitalia. LCCs: Ryanair, easyJet, Vueling Airlines, Wizz Air, Eurowings, Norwegian Air Shuttle, Jet2.com, Flybe, Pobeda, and Condor Flugdienst.

Similar to the trends from Figure 15, Figure 17 shows that the level of route openings and closures at all types of airports has remained relatively consistent over time, with a decrease in openings in 2019. Small airports have the highest proportion of route openings and route closures, while the biggest airports have the smallest proportion. This implies that small airports may rely more on LCCs which have a greater level of route churn. Despite this, route churn is still significant for the other sized airports.

FIGURE 17 SMALLEST AIRPORTS HAVE THE HIGHEST ROUTE OPENING AND CLOSURE RATES

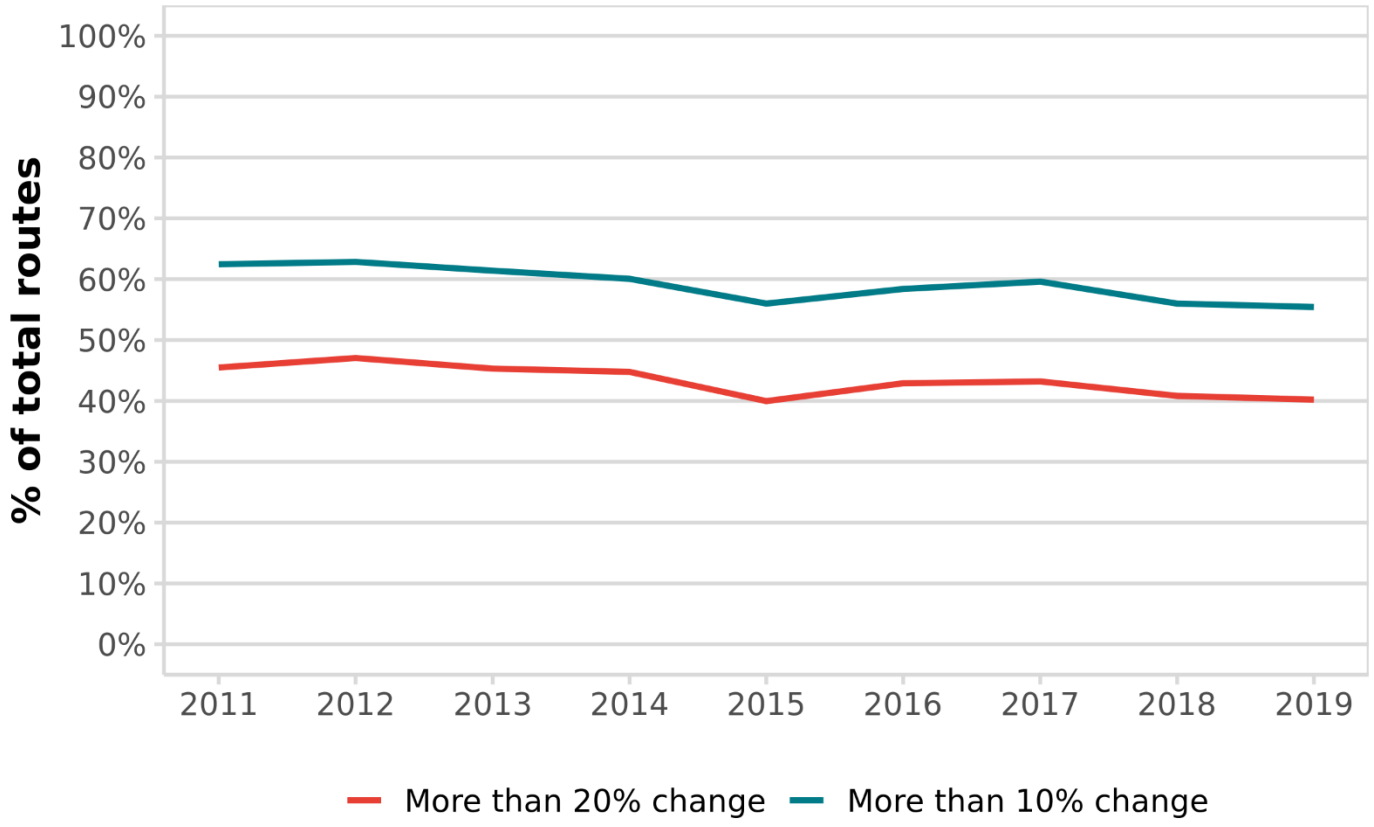


Source: Frontier analysis of OAG data

Note: LHS: This chart shows the proportion of route openings (% of stock), by airport size for flights to/from/within Europe, 2010-2019. RHS: This chart shows the proportion of route closures (% of stock), by airport size for flights to/from/within Europe, 2010-2019. Note that because of definition of route openings and closures, the route openings chart runs from 2011 to 2019, and route closures runs from 2010 to 2018. One route is defined as a service by a unique airline between an origin and destination. Europe is defined as every country with at least one airport which is a member of ACI EUROPE. Monaco is excluded as it only has a heliport. Airport size is defined using the total number of seats arriving and departing each airport in 2019.

Furthermore, as Figure 18 shows, of all routes neither closed nor opened, over 55% saw a change of more than 10% in capacity in a given year. This shows that the volatility in the capacity of routes, although decreasing, is high. This implies that even when a route continues to operate, airports still compete for airline services, as they compete to retain (and attract) capacity and volume. This is a mechanism for airport competition which has not previously been assessed, but appears to be of significant importance.

FIGURE 18 ROUTE CAPACITY VOLATILITY IS HIGH BUT HAS DECREASED OVER TIME



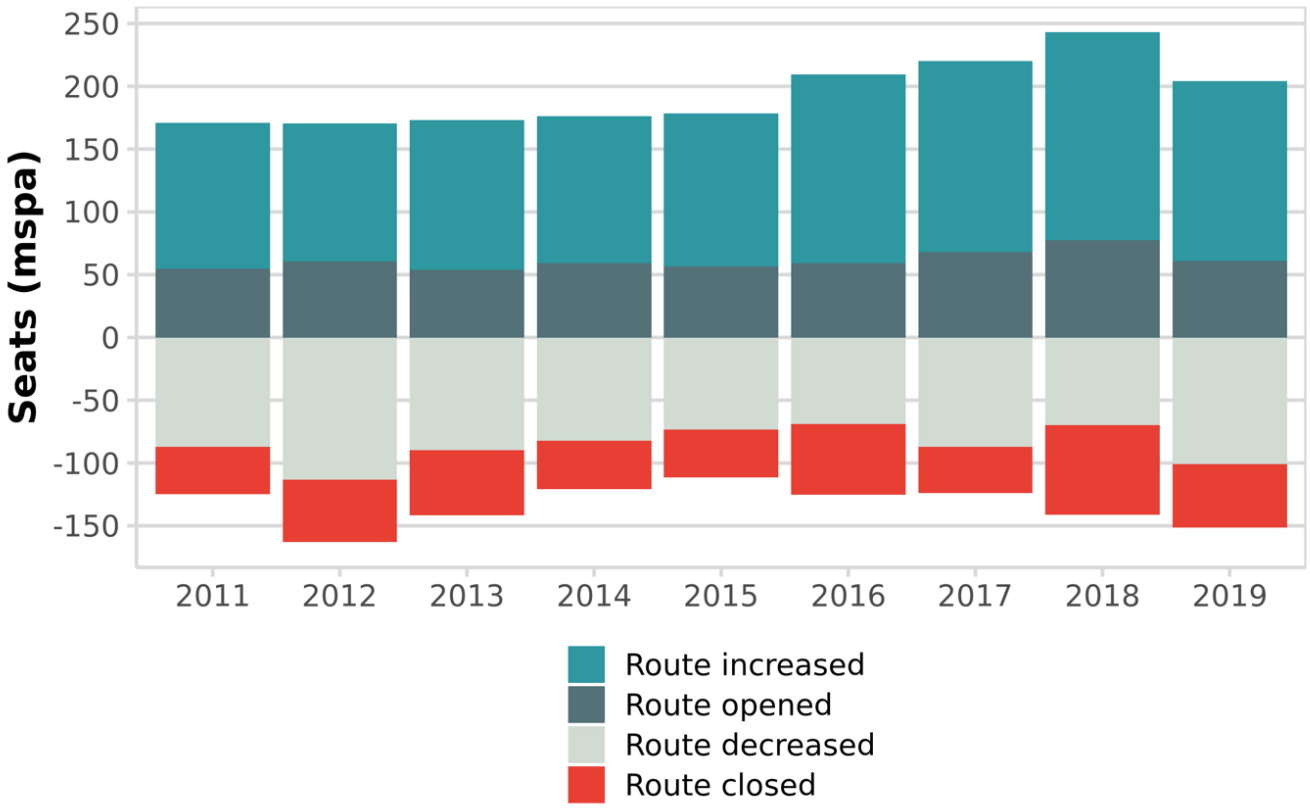
Source: Frontier analysis of OAG data

Note: This chart shows the proportion of routes where seat capacity changed, year-on-year, to/from/within Europe. Each year shows the proportion of routes (present in that year and previous) where the number of seats (total in a year) has changed by ± 10%, 20%. One route is defined as a service by a unique airline between an origin and destination. Europe is defined as every country with at least one airport which is a member of ACI EUROPE. Monaco is excluded as it only has a heliport.

Figure 19 shows that, there are more seats on routes which have experienced relatively large changes in capacity than there are seats on routes which have opened or closed in any given year from 2011 to 2019[44]. This is important for airports as the capacity of routes is an important determinant of airport revenue, regardless of whether those seats come from new/closed routes, or changes in the capacity on existing routes (or, indeed, the retention of existing, unchanged, capacity).

[44] This also holds through when we look at count of routes over time, rather than seats: in 2019, of 23,000 unique routes, about 5,000 were new opened routes but about 10,000 were retained routes with higher seat capacity.

FIGURE 19 CHANGES IN CAPACITY ON EXISTING ROUTES ARE MORE IMPORTANT FOR SEAT CHANGES THAN OPENING OR CLOSURE OF ROUTES



Source: Frontier analysis using OAG data

Note: This chart shows the total seats (million seats per annum) flown in Europe from 2010 to 2019, by the type of route. Europe is defined as every country with at least one airport which is a member of ACI EUROPE. Monaco is excluded as it only has a heliport.

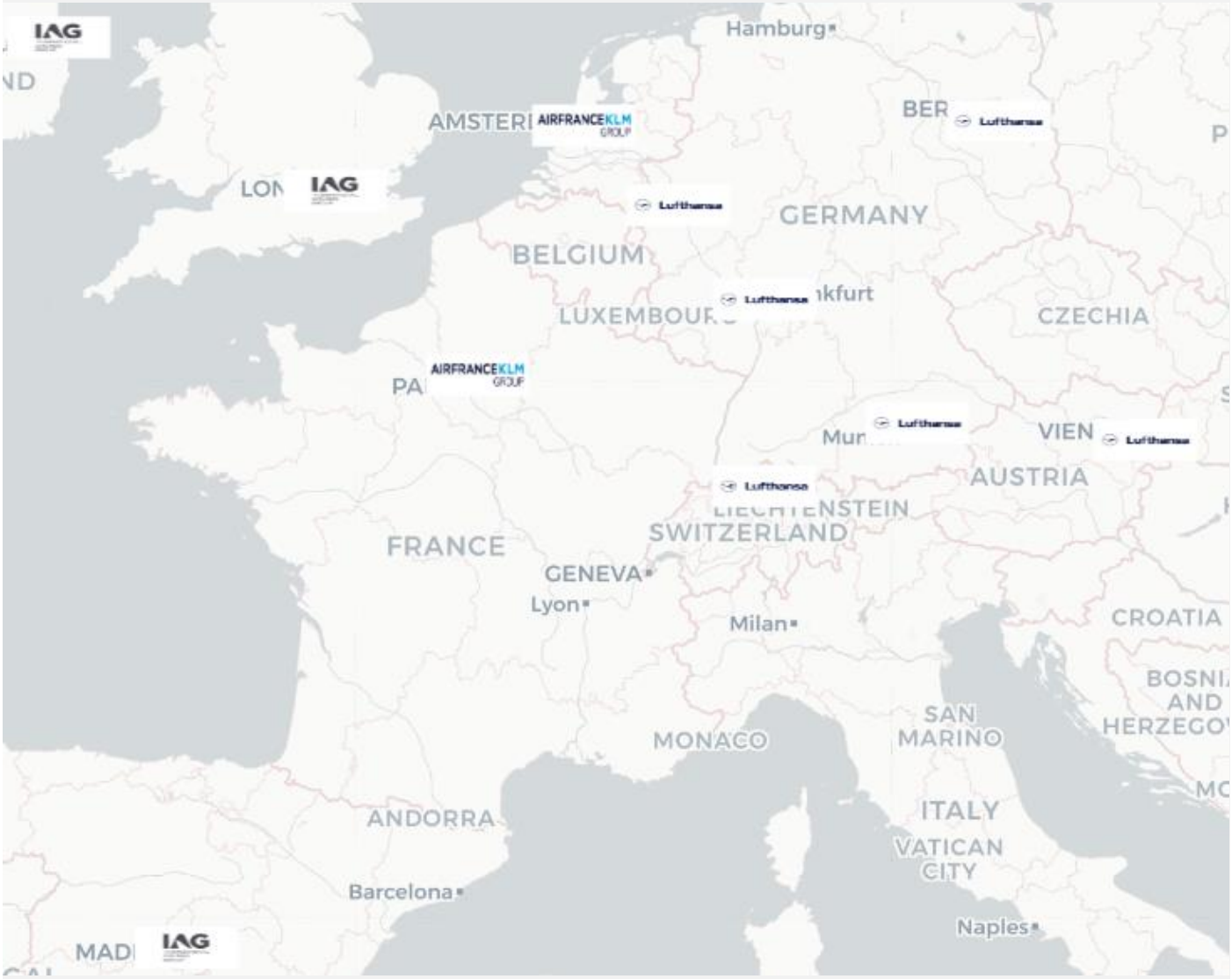
In summary, route churn at all airports remains high, with route churn highest at the smallest airports. New analysis shows that changes in the capacity on existing routes contribute more to changes in seat numbers than the opening of new routes, indicating that airports are competing with each other for increased (or to avoid reduced) capacity on existing routes: illustrating the extent to which routes retained by the airport are subject to competitive constraints exerted by airlines. The evidence on actual changes in capacity is the "tip of the iceberg", demonstrating credible threat of movement that be used in negotiations with airports on all routes. If these negotiations are satisfactorily concluded, then while there would be no change in capacity, the airport will have had to respond to the competitive constraint represented by the credible threat of movement in order to retain the route. This statistical evidence, and the inferences drawn from it, is consistent with information in the public domain, see box below, and airport attendance at route development conferences where airports market themselves to airlines for a share of the airlines' capacity to grow airport route networks and traffic volumes.

AIRLINE-AIRPORT NEGOTIATIONS: MULTI-HUB OPTIMISATION

Airports negotiate with airlines to attract and/or retain air services to and from an airport.

As set out in this section 4.1, FSCs have lower route churn rates than LCCs, partly because they are often linked to a hub where most of their aircraft are based. However, with the rise of multi-hub systems (see figure below) –where an airline group manages multiple hubs – FSCs have increasingly been able to switch routes, and thus negotiate harder with airports.

FIGURE 20 HUBS OF MAJOR AIRLINE GROUPS: LUFTHANSA GROUP, IAG AND AIRFRANCE-KLM



Source: Frontier analysis.

Note: This map shows the locations of hubs of major European airline groups, Lufthansa Group, International Airlines Group (IAG), and Air France-KLM. The hubs are Frankfurt Airport, Munich Airport, Berlin Airport, Dusseldorf Airport, Vienna Airport, and Zurich Airport for Lufthansa Group; London Heathrow Airport, Madrid-Barajas Adolfo Suarez Airport, and Dublin airport for IAG; and Paris Charles de Gaulle Airport, and Amsterdam Schiphol Airport for Air France-KLM.

For example, Lufthansa Group announced in 2018[45] that it would optimise its multi-hub system by shifting its growth focus from Frankfurt to Munich. This move included moving routes (and aircraft) from Frankfurt to Munich, increasing the frequency of several routes in Munich, and the creation of new connections to Asia from Munich. The focus of the Frankfurt hub was instead geared more towards an improvement in quality: improving time ratings and operational stability. Each Lufthansa Group hub was given a strategic focus: Munich on growth in connections to Asia; Frankfurt on quality improvements; Zurich on sustained moderate growth; and Vienna on expansion of its European network. According to Harry Hohmeister, Member of the Executive Board of Deutsche Lufthansa AG and Head of Hub Management, this was only possible because of Lufthansa's multi-hub system, allowing Lufthansa to "react to changing conditions with extreme speed and flexibility."

This case study demonstrates how FSCs operating at multiple hubs can use that as a mechanism to reallocate capacity between those airports, even where that airline is operating a hub operation.

4.1.2 COMPETITION FOR SPOKES TO HUBS

Another element of competition for airline services is for connections to hubs in the Middle East[46]. We consider this geographic region because in 2019, the Middle Eastern hubs had some of the greatest number of connections to European airports. Between 2016 and 2019, the number of European airports connected to a Middle East hub increased by 25%, equivalent to 19 airports. This section considers how connectivity to these Middle Eastern hubs has changed over time, across airport size categories (and the next section (section 4.2) considers the implications of this connectivity for competition for connecting passengers).

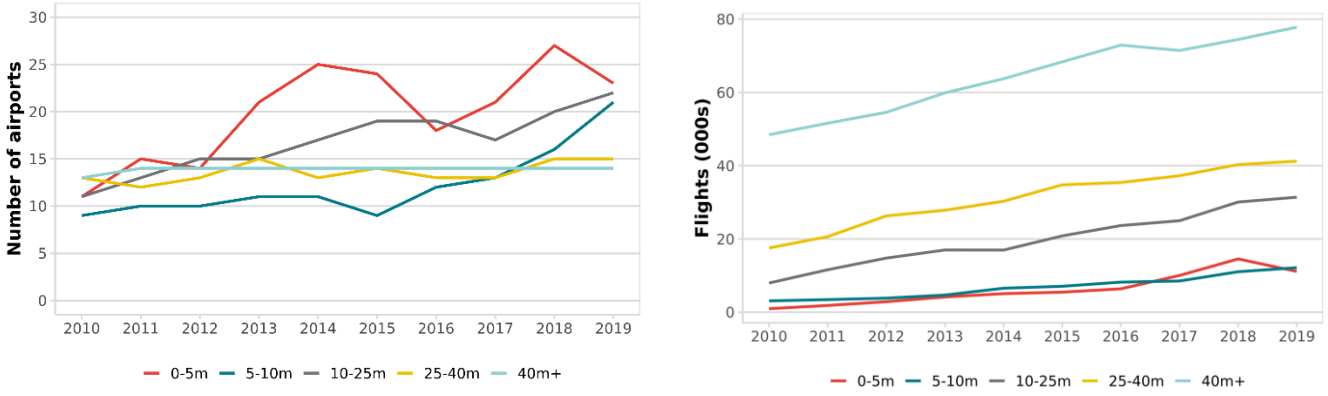
Connections to hubs in the Middle East remain an important facet of competition between airports in Europe. The number of European airports with connections to hubs in the Middle East continued to increase post-2016, as Figure 21 below shows.

The exception to this is the largest airports (25-40mspa, and 40mspa+). For these size categories, the number of airports with connections stayed roughly the same between 2016 and 2019 (because they all had connections to these hubs pre-2016), however flight numbers increased by 9% from 2017 to 2019, after a slight decrease from 2016 to 2017, for 40mspa+ airports, and by 11% for 25-40mspa airports. More broadly, flight numbers also increased from all other airport sizes to hubs in the Middle East.

[45] Lufthansa Group Press Release, 27 September 2018.

[46] Increasingly, there may be competition for connections to hubs in other parts of the world such as North America as well.

FIGURE 21 AN INCREASING NUMBER OF SMALL AIRPORTS ARE CONNECTING TO THE MIDDLE EAST (LEFT HAND CHART) AND AN INCREASING NUMBER OF FLIGHTS TO THE LARGEST AIRPORTS (RIGHT HAND CHART)



Source: Frontier analysis using OAG data

Note: LHS: This chart shows the number of airports with connections to Middle East hubs, to/from Europe, by airport size from 2010-2019. RHS: This chart shows the number of flights (in thousands) to Middle East hubs, to/from Europe, by airport size from 2010-2019. Middle East hubs refer to Abu Dhabi, Dubai, and Doha. Europe is defined as every country with at least one airport which is a member of ACI EUROPE. Monaco is excluded as it only has a heliport. Airport size is defined using the total number of seats arriving and departing each airport in 2019.

4.1.3 RESOURCES USED IN MARKETING AND BUSINESS DEVELOPMENT ACTIVITY

As outlined in section 2, airports devote resources to attracting airlines' services through a range of marketing and business development activities, including attendance at Routes conferences and ongoing discussions with airlines. For example, over 50 European airports and airport groups are scheduled to attend the next Routes World conference in 2022.[47]

The table below reproduces a finding from a recent airport survey and shows that – across all sizes of airport - budgets for route development activity have increased over the five years to 2019.

TABLE 5 ROUTE DEVELOPMENT BUDGETS BY AIRPORT TYPE

	LARGE HUB	SMALLER HUB	REGIONAL
Substantial increase	2	3	14
Small increase	2	3	14
Small decrease	1	3	3
Substantial decrease	1	0	0

Source: Bilotkach, V. and Bush, H. (2020), 'Airport competition from airports' perspective: evidence from a survey of European airports", Competition and Regulation in Network Industries, Vol. 21(3), p. 282.

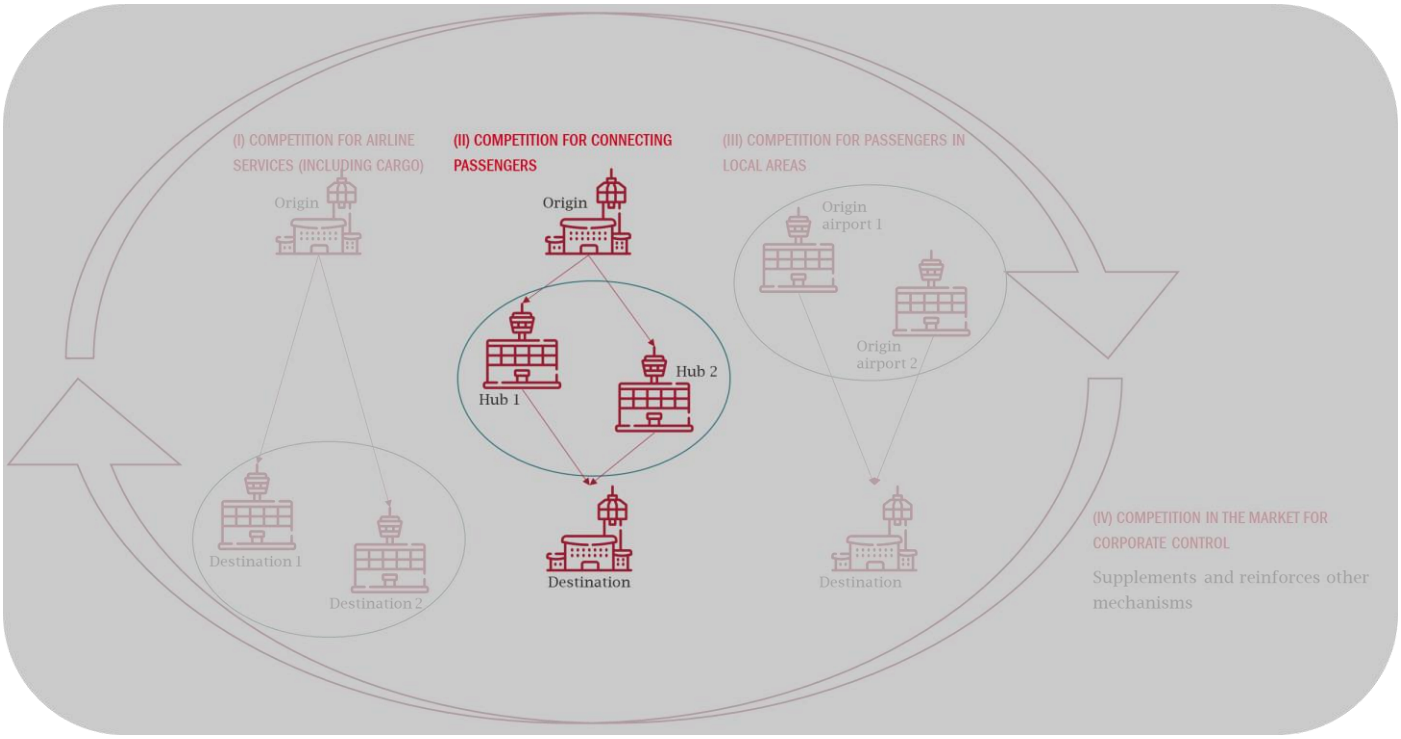
Note: In this study, "large hubs" are airports in the top-10 largest airports in Europe in 2019; "smaller hubs" are airports operating as a hub for a network carrier; "regional" airports do not handle much, if any, transfer traffic.

[47] Routes (2022). Available at: https://www.routesonline.com/events/236/routes-world-2022/attending-delegates/?orgtypeid=1&countryid=257&listorder=atoz#mainContent (Accessed 1 July 2022).

4.2 COMPETITION FOR CONNECTING PASSENGERS

In this section, we examine how airports in Europe compete for connecting passengers. This competition takes place across a wide geographic footprint, with hub airports (largely the very biggest airports in the Europe – including Turkey) competing with each other and with hubs in the Middle East for these connecting passengers.[48] This aspect of airport competition is shown in the figure below.

FIGURE 22 VISUALISING COMPETITION FOR CONNECTING PASSENGERS



Source: adapted from Oxera report for ACI EUROPE and Frontier Economics. Oxera (2017), "The continuing development of airport competition in Europe", 15 September.

Note: blue line indicates boundary of airport competition for that mechanism.

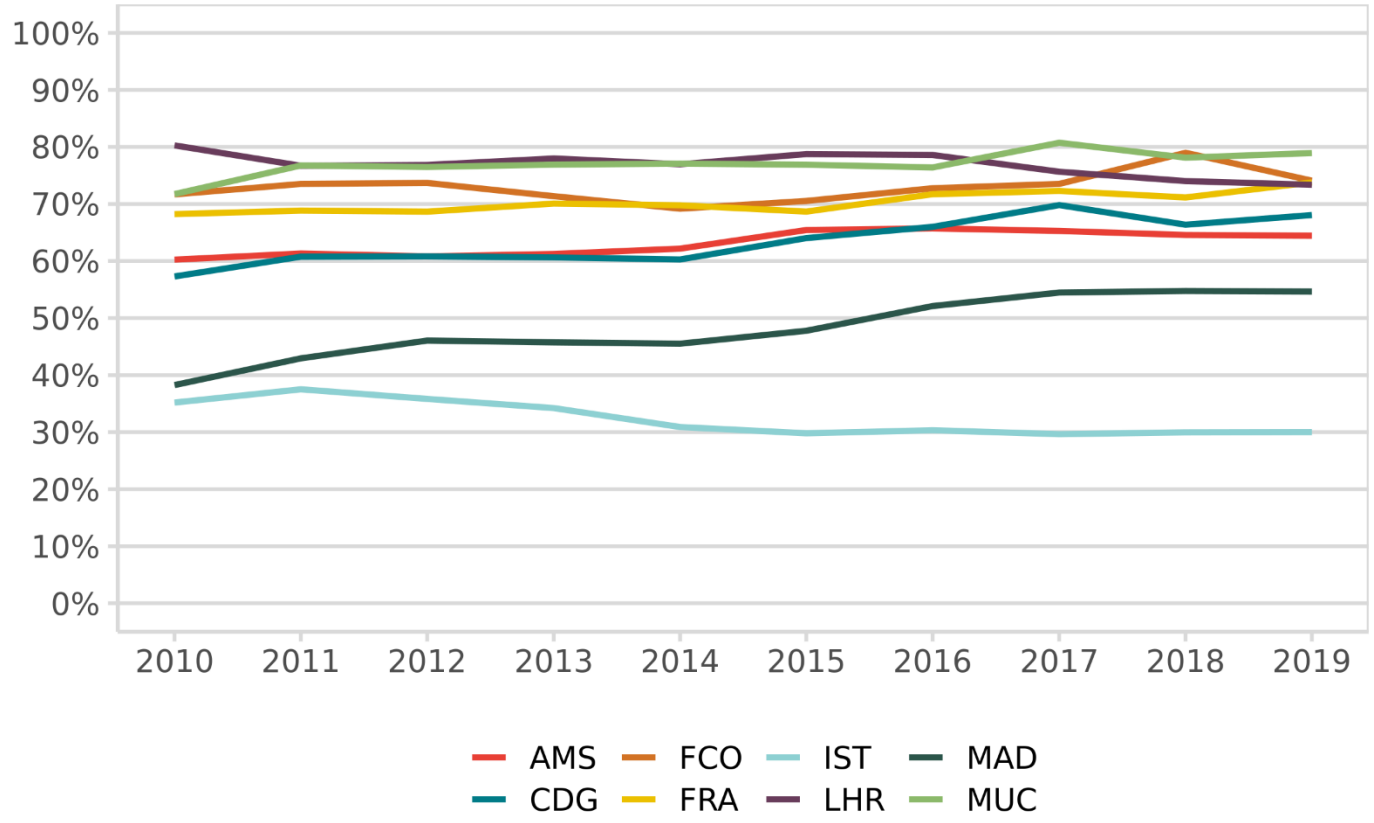
We begin by exploring the competition between hubs in the EU and the impact of the growth in hubs in the Middle East on competition for connections (section 4.2.1). Then, we examine how the option of a direct flight compared to a connecting flight has evolved (section 4.2.2) and increased the competitive pressures in this segment of the market.

4.2.1 PROPORTION OF COMPETING ROUTES

From 2010 to 2019, competition between European hubs (measured as the proportion of connecting routes where an alternative route is available through another European hub) remained high and stable (Figure 23), albeit declining in the case of Heathrow and Istanbul and slightly increasing for some others. Excluding Madrid and Istanbul, in all periods the proportion of competed routes is above 50%. For Madrid, the proportion of competed routes increased to above 50% post-2016.

[48] There is likely to also be competition between European hubs for westward traffic, for example Madrid and Lisbon as hubs for flights towards South America, but this was not examined in this study.

FIGURE 23 THE PROPORTION OF CONNECTING ROUTES COMPETED BY OTHER EUROPEAN HUBS REMAINED HIGH AND STABLE

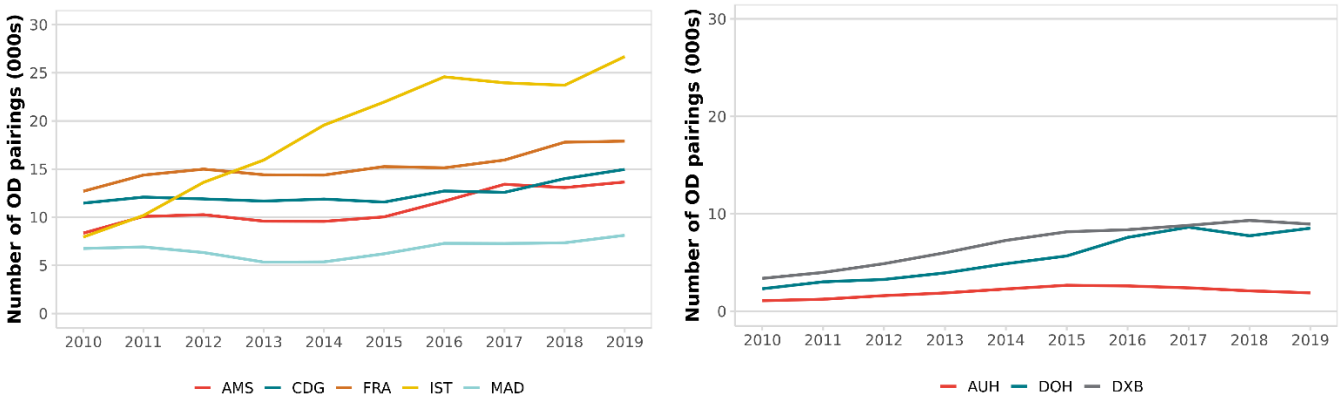


Source: Frontier analysis of OAG data

Note: This chart shows proportion of connecting routes at selected European airports competed by other European hubs. In defining connections, we follow the methodology of the previous study, see Annex 4 in the Oxera (2017) study for details.

Middle Eastern hubs compete intensely with European airports for connecting traffic. Since 2016, the number of connecting flights offered from European airports through hubs in Europe and the Middle East continued to increase slightly at most European hubs and Doha, but was flat or declining at Dubai and Abu Dhabi. Figure 24 shows the number of origin-destination pairings served from 2010 to 2019 by selected European (Amsterdam, Charles de Gaulle, Frankfurt, Madrid and Istanbul) and Middle East hubs (Abu Dhabi, Doha, and Dubai).

FIGURE 24 GROWTH IN CONNECTING FLIGHTS FROM EUROPEAN AND MIDDLE EAST HUBS

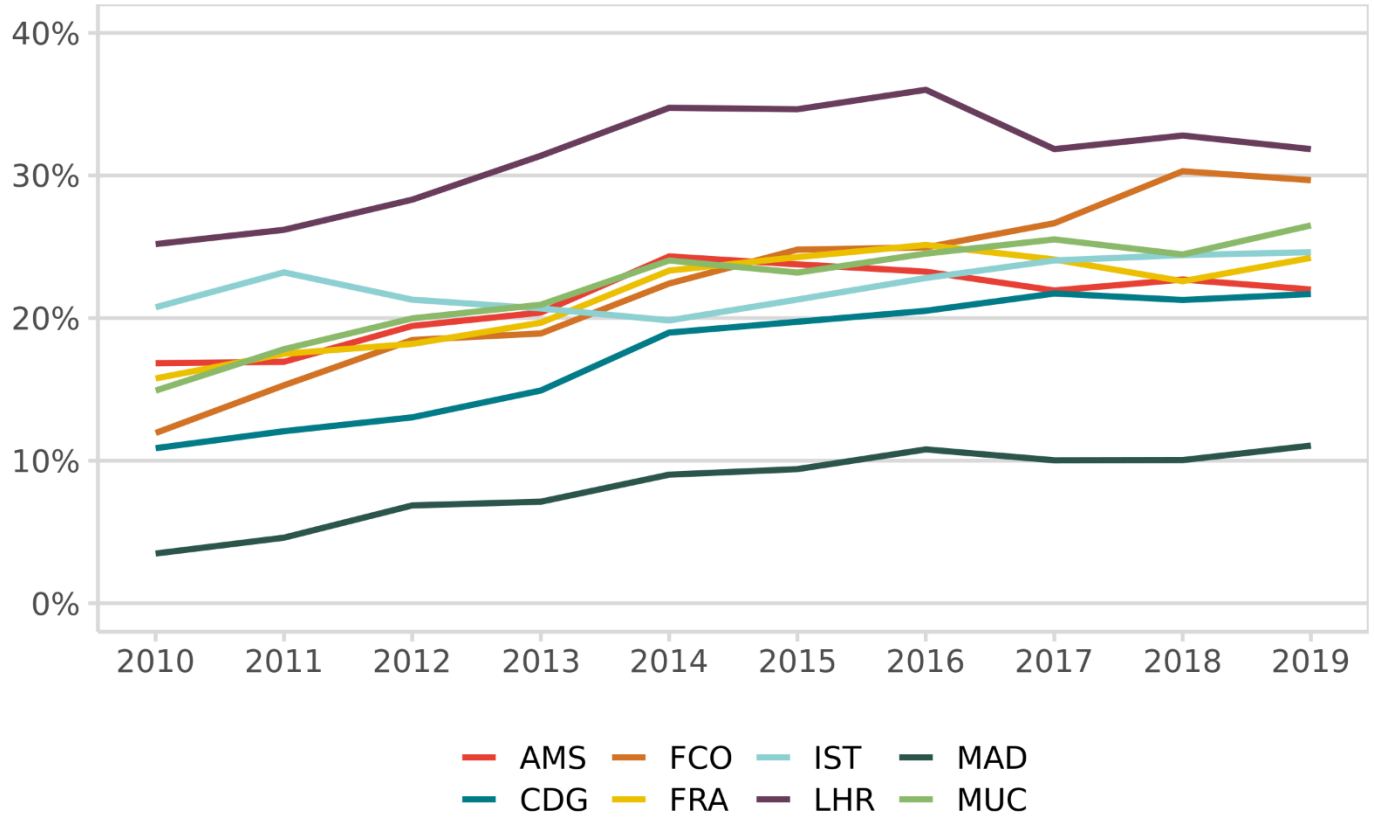


Source: : Frontier analysis using OAG data

Note: This chart shows the number of origin destination pairings (in thousands) served by a connecting flight through selected airports. In defining connections, we follow the methodology of the previous study, see Annex 4 in the Oxera (2017) study for details.

The proportion of connecting routes competed by Middle Eastern hubs has grown between 2010 and 2019. We find that post-2016, competition from these Middle Eastern hubs (measured as the proportion of connected routes where an alternative route is available through a hub in the Middle East) is still significant, but no longer increasing, except for Rome Fiumicino airport and Istanbul. For some airports, for example Heathrow, competition from Middle Eastern hubs declined over this period. Excluding Madrid, over 20% of connecting routes were available through hubs in the Middle East in 2019. For Madrid, this proportion is lower (reflecting the westward bias in its traffic) but increased to just over 10% in 2019.

FIGURE 25 THE PROPORTION OF CONNECTING ROUTES COMPETED BY MIDDLE EASTERN HUBS HAS GROWN BETWEEN 2010 AND 2019



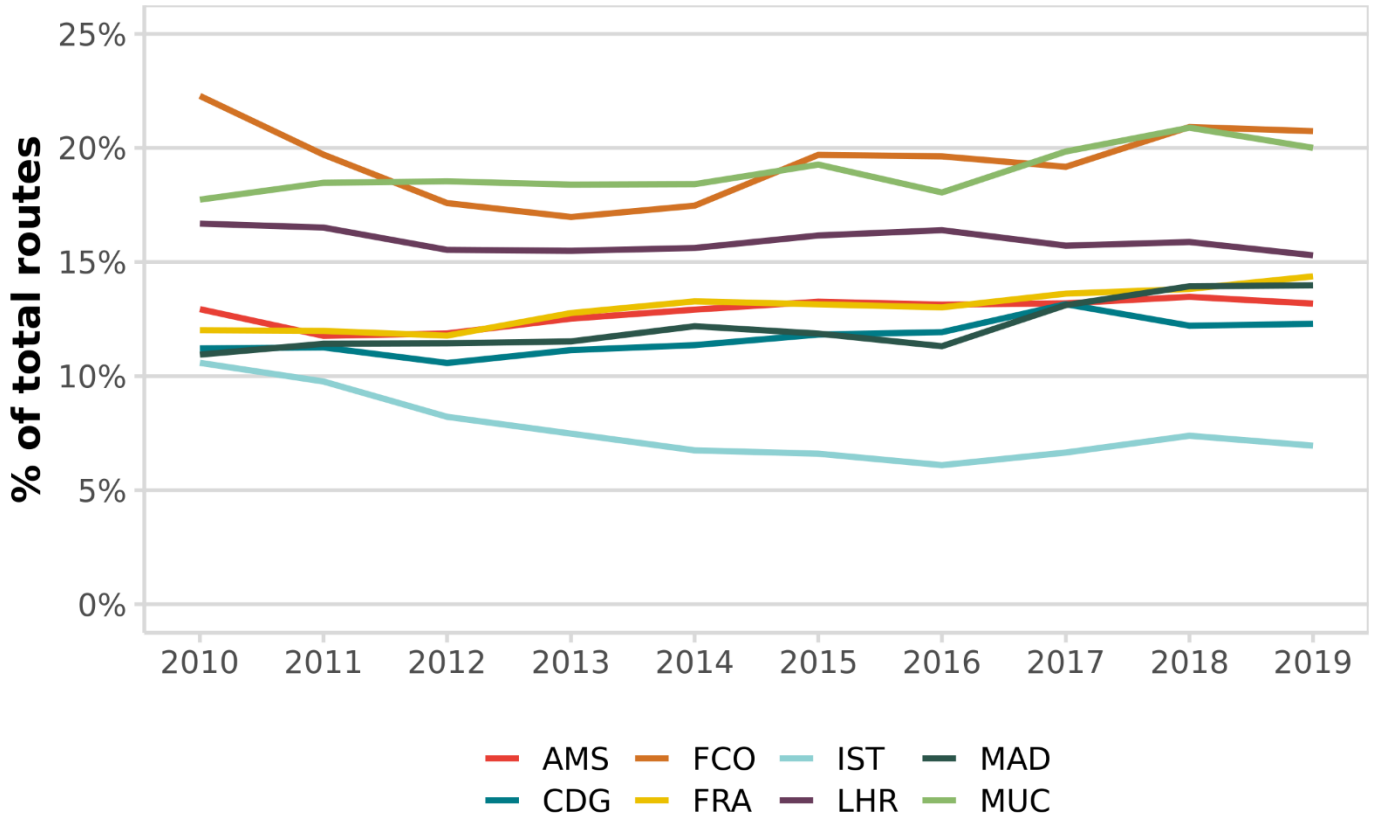
Source: Frontier analysis of OAG data.

Note: This chart shows proportion of connecting routes at selected European airports competed by hubs in the Middle East. This chart excludes intra-Europe since it is unlikely that, due to geographical positions that a Middle East hub would be used to travel in Europe. In defining connections, we follow the methodology of the previous study, see Annex 4 in the Oxera (2017) study for details.

4.2.2 HUB BYPASS

Another source of competition for connecting passengers at European hubs is from direct flights i.e., for passengers who have the option of either connecting through a particular airport by taking a direct flight. Figure 26 shows the proportion of intra-EU connecting flights via European hubs where a direct flight was available from origin to destination. Although fluctuating year on year, in many cases, there is a slight upward trend from 2010 to 2019 (except for Istanbul); this shows that direct flights are a source of increasing) competition for connecting passengers.

FIGURE 26 INCREASING TREND IN DIRECT FLIGHTS WITHIN THE EU



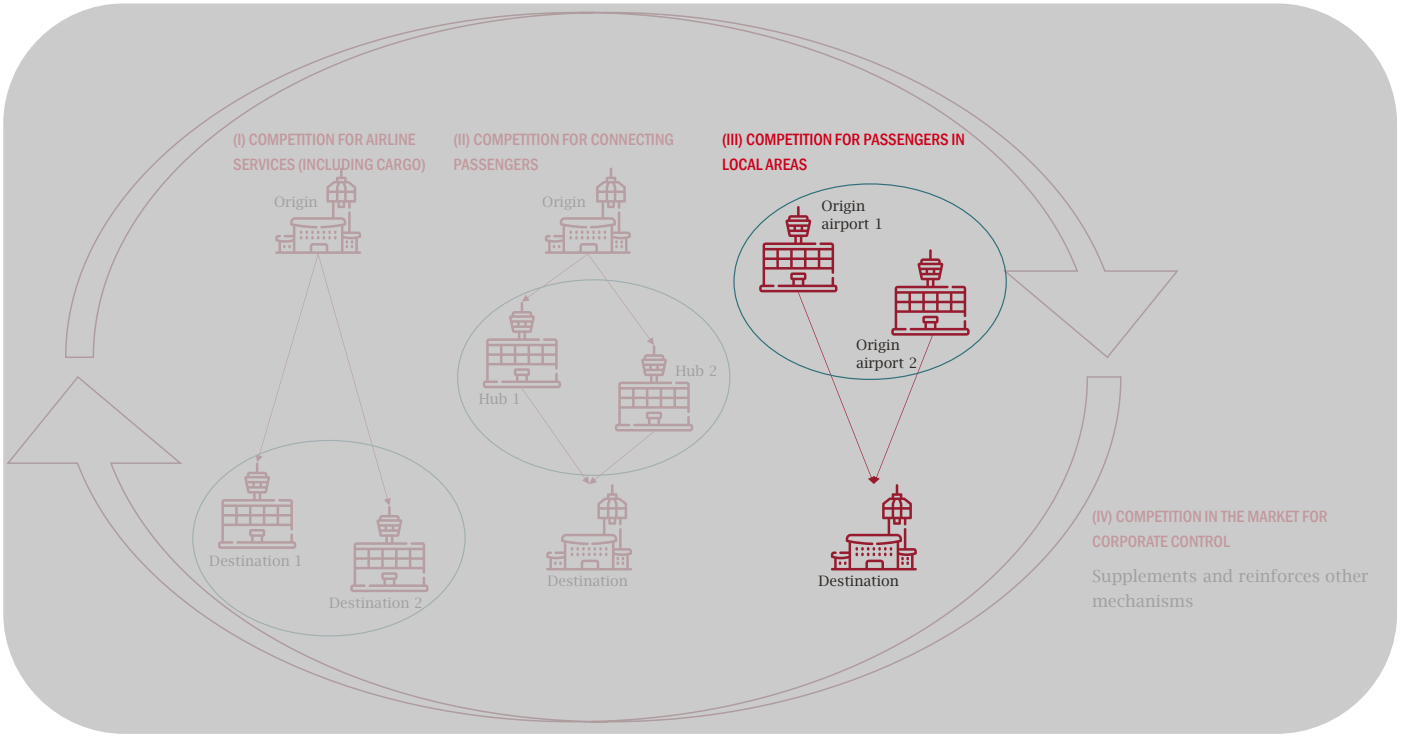
Source: Frontier analysis of OAG data.

Note: This chart shows proportion of intra-EU connecting routes at selected European airports competed by direct flights. In defining connections, we follow the methodology of the previous study, see Annex 4 in the previous study for details.

4.3 LOCAL COMPETITION

In this section, we examine how airport competition for local passengers has evolved over time. This type of airport competition is illustrated in the figure below.

FIGURE 27 VISUALISING COMPETITION FOR PASSENGERS IN A LOCAL AREA



Source: adapted from Oxera report for ACI EUROPE and Frontier Economics. Oxera (2017), "The continuing development of airport competition in Europe", 15 September.

Note: blue line indicates boundary of airport competition for that mechanism.

To examine this aspect of airport competition, we consider the options of a potential passenger who lives within the vicinity of multiple airports and wishes to fly to a certain destination. If more than one airport offers flights to the destination, the passenger has the choice of which airport to use, and therefore those airports compete with each other for that passenger. Some proportion of the local passengers will be flexible as to destination creating more options. Therefore, our definition of competition (airports offering flights to the same destination) will understate the true level of competition for local passengers.

Given that the development of new airports over time is relatively limited, most of this competition will come from the increased connectivity of existing airports, to match other nearby airports. As the aviation industry continues to grow, there will be a broader range of flights available from a greater number of airports.

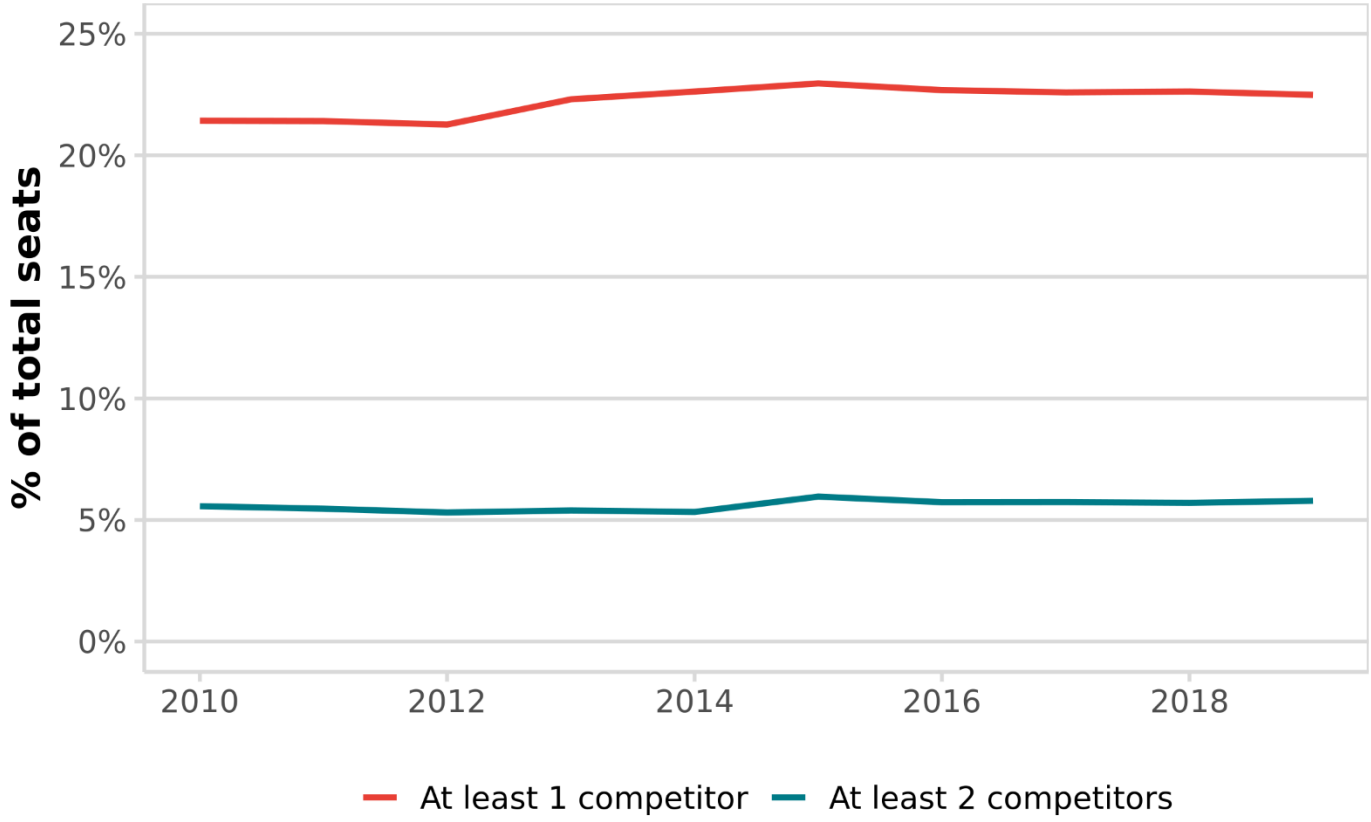
Moreover, growth in the leisure market (as outlined in section 3.3) is likely to increase competition between airports geographically close to each other. This is because, as outlined in the 2017 ACI study, an increase in the share of leisure travel will increase the catchment area of airports. For example, a business traveller may only be willing to substitute between relatively close airports, while a leisure traveller may be prepared to travel further to access lower cost flights. As outlined in section 3.3, this increase in leisure travel continued for several European countries between 2016 and 2019. Further competition may also be generated between destination airports since leisure passengers may be more flexible in their final destination.

4.3.1 PROPORTION OF COMPETED ROUTES

In determining what counts as an alternative, for the purposes of this report we consider airports within a 100km straight-line catchment area, following the European Commission's State Aid guidance[49]. We further consider only airports that offer the same route at least 50% frequency, that is, Airport B is only considered an alternative to Airport A for a given route if it is within 100km of Airport A, and if it offers that route at least 50% the frequency of Airport A. If Airport A offers the route 10 times a week, Airport B has to offer it at least 5 times a week to count as a local competitor.

Figure 28 shows that although local competition has increased slightly over time, it is mostly stable. The total number of (capacity-weighted) routes with at least one alternative increased from 21% to around 23%, and stayed there.

FIGURE 28 COMPETITION FROM OTHER AIRPORTS IN THE DEPARTING AIRPORTS' HINTERLANDS IS CONSTANT OVER TIME



Source: Frontier analysis of OAG data

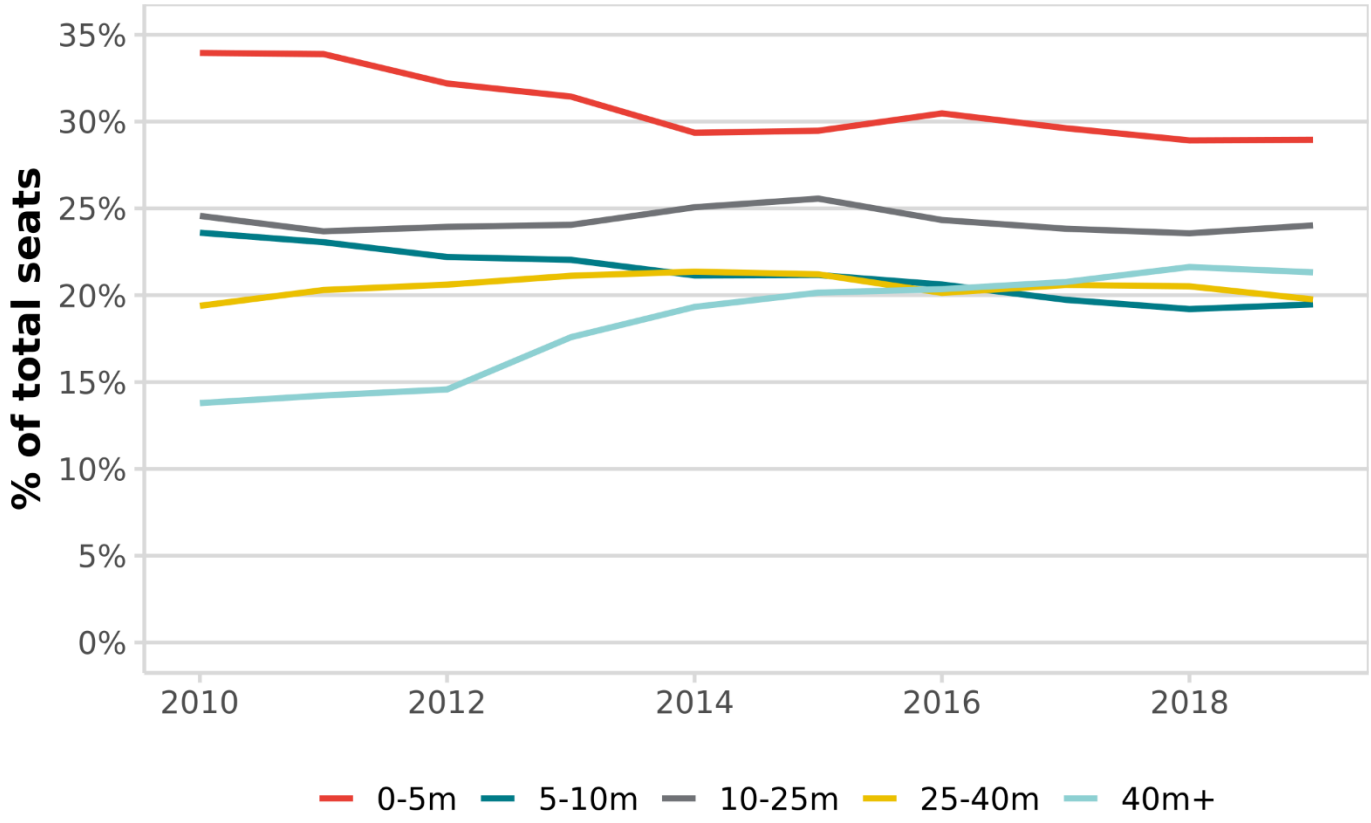
Note: This chart shows the proportion of seats on routes with competitors. Alternatives are required to have a frequency equivalent to at least 50% of that of the reference route. Based on traffic departing countries with at least one member of ACI EUROPE. Distances are based on straight line measurement.

When we break this down by airport size, the picture is more varied (Figure 29): for small airports (below 25m), local competition decreased (for example, by 5 percentage points for airports in the 0-5m category) from 2010 to 2019. For large airports, however, particularly for 40m+ airports, local competition increased. However, if we focus on the years post-2016, local competition is largely constant over time: between 20%

[49] European Commission (2014) *Guidelines on State aid to airports and airlines.*

and 30% of seats were on routes with competitors between 2016 and 2019, across all airport sizes. This is a significant, but non-increasing, figure.

FIGURE 29 LOCAL COMPETITION HAS INCREASED MOST FOR LARGE AIRPORTS OVER THE PERIOD SINCE 2010, BUT IS LARGELY FLAT ACROSS ALL AIRPORT SIZES SINCE 2016



Source: Frontier analysis of OAG data

Note: This chart shows the proportion of seats on routes with competitors, by airport size. Alternatives are required to have a frequency equivalent to at least 50% of that of the reference route. Based on traffic departing countries with at least one member of ACI EUROPE. Distances are based on straight line measurement. Airport size categories are based on millions of passengers in 2019 (or 2018 where 2019 data not available).

4.4 CORPORATE CONTROL

In this section, we consider the market for the corporate control of airports and parts of airports, and how this affects airport competition. Corporate control includes acquisition of entire airports, a concession to operate an airport for a defined period, or management/operating contracts for substantial parts of an airport such as a terminal[50]. As mentioned in section 2.4, the market for corporate control affects airport competition and improves market outcomes by providing incentives to airport owners to invest in their airports and deliver a well-run, growing airport. This reinforces the mechanisms by which airports compete which are outlined above.

Due to data limitations, this report considers overall changes in corporate control (i.e., changes in the ownership of an airport or a concession to operate an airport), rather than operating/management

[50] In this assessment, we consider competition between airports and not competition within an airport. The latter subject is out of scope of this report and has different and problematic economic characteristics and impacts.

contracts for substantial parts of airports although the lessons we draw should also be applicable to the latter transactions

We begin this section with an overview of how the market for corporate control has evolved (section 4.4.1), drawing on evidence on airport transactions. Then, we briefly examine how this market affects competition (section 4.4.2). We finish with two case studies based on major players in this market (section 4.4.3).

Overall, the evidence shows that the market for corporate control of airports is a global market which is growing and competitive over the period 2009-2016, but stable from then onwards. This market reinforces the other ways in which airports compete as airport managers and owners work to gain (or maintain) traffic volumes and good reputations, in order to win future bids. By "raising the bar" across airports involved in this market for corporate control, this mechanism affects all airports, regardless of ownership structure.

4.4.1 AN OVERVIEW OF THE MARKET FOR CORPORATE CONTROL OF AIRPORTS

For the past 25 years, there has been an increasing involvement of the private sector in airports, either through wholesale or partial privatisation, or through concession arrangements[51]. In 1987, the UK became the first country to privatise its major airports, with the stock market listing of British Airport Authority. This was soon followed by similar developments in other countries such as Canada, Australia, and Italy[52].

The market for ownership of airports is large: in 2019, the proportion of passenger traffic held by airports with private sector participation in Europe was 76%[52]. It is also global: competitions for corporate control of airports attract players (both airport groups and investment funds) from all over the world. For example, the potential privatisation of St Louis Lambert International airport in 2017[53] attracted 18 different bidders[54], from all over the world such as AENA (from Spain), Odinsa (from Colombia), and Royal Schiphol Group (from the Netherlands)[55].

The figure below shows the number of airport transactions (excluding new builds and refinancing projects) between 2009 and 2019 using data from Inframation. This data covers contracts for privatisations and concessions of airports, not for contracts relating to smaller, or partial, control of airports: for example, for management contracts of a terminal. This data is therefore only a partial snapshot of the approach to corporate control. Nevertheless, it shows that the overall trend is an increasing number of airport transactions over the sample period.

[51] Concessions, or rather Build-Operate-Transfer (BOT), are the biggest type of airport privatisation. About 78% of privatised airports follow this approach (ACI, InterVISTAS, 2022).

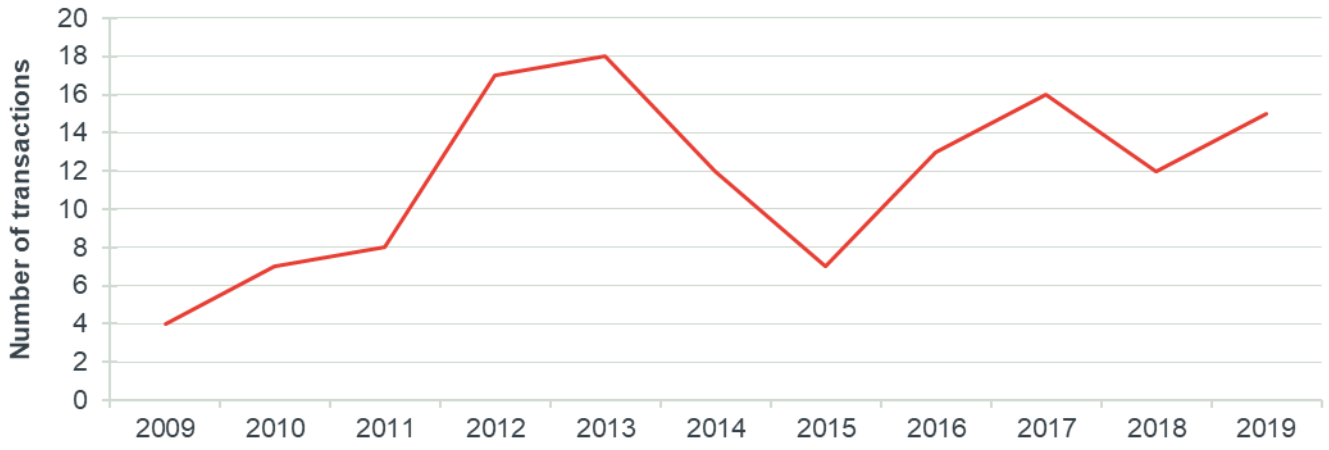
[52] ACI, InterVISTAS (2022) *The State of Play: Competition, Regulation, and Airport Charges*. Available at: https://store.aci.aero/product/the-state-of-play-competition-regulation-and-airport-charges-research-report/(Accessed 26 July 2022).

[53] The privatisation project started in 2017 but was stopped in 2019 before any of the interested parties could start bidding.

[54] Letter from the mayor of St. Louis to the Airport Working Group (2019). Available at: https://fly314.com/wp-content/uploads/2019/12/Mayors-Letter-to-Airport-Working-Group-Dec-20-2019.pdf (Accessed 26 July 2022).

[55] St. Louis Public Radio (2019) *18 Companies Want To Lease St. Louis' Airport — Here's What You Should Know About Them*. Available at: https://news.stlpublicradio.org/economy-business/2019-11-06/18-companies-want-to-lease-st-louis-airport-heres-what-you-should-know-about-them (Accessed 26 July 2022).

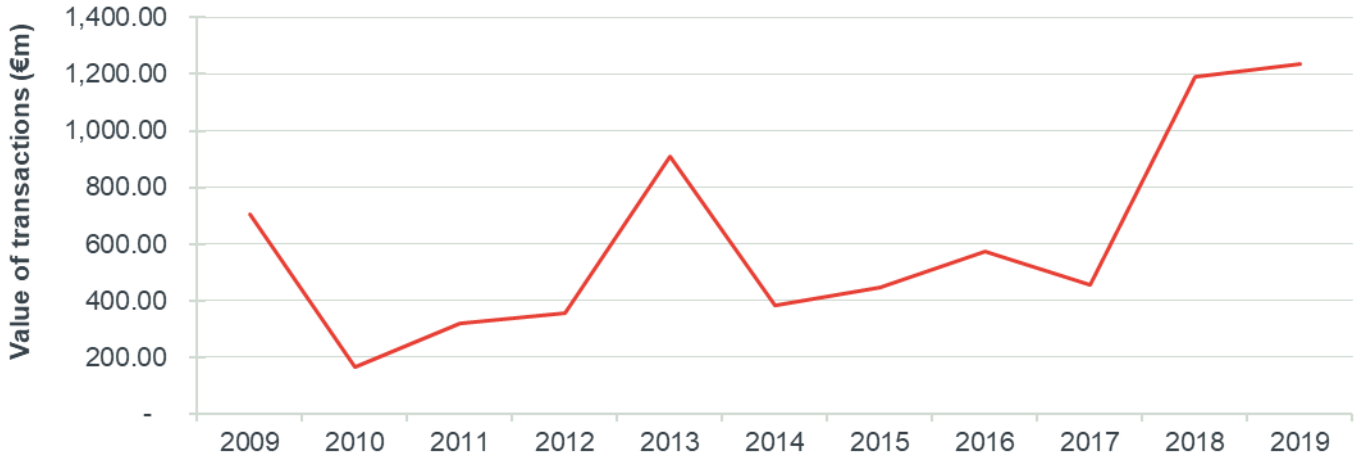
FIGURE 30 NUMBER OF AIRPORT TRANSACTIONS IN EUROPE BETWEEN 2009-2019



Source: Source: Frontier analysis of Inframation data
Note: The sample excludes new build airports and refinancing projects

The figure below shows the average value of airport transactions over the same sample period, in real 2019 prices. As with the number of transactions, there is some volatility in the year-on-year transaction values. However, average transaction size increased from €164 million in 2010 to €1.2 billion in 2019.

FIGURE 31 AVERAGE VALUE OF AIRPORT TRANSACTIONS IN EUROPE BETWEEN 2009-2019



Source: Frontier analysis of Inframation data
Note 1: The sample excludes new build airports and refinancing projects
Note 2: All financial values are in real 2019 prices

Both charts show that the market for corporate control of airports has grown over time. Further evidence on the development of the market for corporate control is a report by Price Waterhouse Coopers (PwC) on airport valuations[56] wherein it is estimated that valuation multiples for airports rose in the years preceding the pandemic, with valuation multiples averaging ~22x the EBITDA between 2016 and 2018, significantly

[56] PwC (2019) *Airport valuations have taken off – the question is where will they land?*. Available at: https://www.pwc.co.uk/transport-logistics/assets/airport-valuations-february-2019.pdf (Accessed 26 July 2022).

above the 15x average between 2013 and 2015. The report finds that the combination of the low-yield, low-interest rate environment, a broad (and widening) airport investor base, and scarcity of good airport investment opportunities have made recent airport deals highly competitive[57]. This is re-affirmed by data on the number of qualified bidders for airport concessions and privatisations[58].

Overall, the evidence shows that the market for airport corporate control, is large and competitive. In the next section, we briefly examine what this means for airport competition.

4.4.2 CORPORATE CONTROL AND AIRPORT COMPETITION

The previous section showed that the market for airport corporate control is large and competitive. This has a direct effect on airport competition in three ways.

Firstly, prospective bidders have to develop a good track record of airport management to participate in a bid for a new opportunity. They do this by investing in airports they own or manage. When they win a bid, they have to follow through on proposals made or specified by the bid which will, in many cases, contain requirements for investments in aspects of airport operations that consumers value such as service quality. The increasing activity in airports as an asset class, as shown by the figures above, suggests that airport groups that wish to bid for future airport concessions or investors bidding for acquisitions potentially face greater competition, and therefore have stronger incentives to increase their competitiveness across all their activities, and demonstrate measurable accomplishments for good management.

Secondly, the increased investments and performance of these airports where there is active competition for corporate control means other airports have to compete harder to win airline and passenger services. In this way, the market for corporate control spreads competition across the aviation market.

Finally, changes in the corporate control of all (or parts) of an airport provide opportunities for the spreading of innovation and best practice across airports: thus, increasing the efficiency of all airports within the sector. This is illustrated in the quote below from Lisbon Airport, explaining how its ownership by Vinci results in innovation in a particular aspect of airport operations. In turn, this increased innovation within airport groups active in this market may provide them with a competitive advantage in future competitions.

[57] This PWC report also suggests that investors are attracted to airports because of typically high operating margins which arise because of high barriers to entry, limited competition and economies of scale. This report demonstrates that while the first and third of these explanations are supported by the evidence, the airport market is not consistent with an assertion of "limited competition".

[58] From ACI WORLD (2018) *Policy Brief: Creating fertile grounds for private investment in airports*. Available at: https://store.aci.aero/product/policy-brief-creating-fertile-grounds-for-private-investment-in-airports/ (Accessed 26 July 2022).

"LISBON AIRPORT IS ONE OF THE FIVE VINCI INNOVATION CENTRES OF EXCELLENCE NAMELY FOR SMART TERMINAL OPERATIONS AND TECHNOLOGY, WHERE NEW CONTACTLESS SOLUTIONS ARE IMPLEMENTED OR ADAPTED FOR MORE AUTOMATED BOARDING PROCEDURES, WITHOUT COMPROMISING SAFETY OR SECURITY" [59]

LISBON AIRPORT

There is evidence[56] that airline traffic growth further drives airport valuations, suggesting a close link, between airports being successful in attracting passengers and achieving successful valuations in the market for corporate control.

[59] From ACI EUROPE (2020) *ANA Aeroportos de Portugal: "working to guarantee consistently safe conditions in the end-to-end air travel experience"*. Available at: http://www.airport-business.com/2020/11/ana-aeroportos-de-portugal-working-guarantee-consistently-safe-conditions-end-end-air-travel-experience/ (Accessed 26 July 2022).

4.4.3 CASE STUDIES ON CORPORATE CONTROL

AENA

Aena is a 51% state-owned airport operator, managing 46 airports and 2 heliports in Spain and a further 23 airports in Europe and America[60]. Examples of airports under Aena's management include Adolfo Suárez Madrid–Barajas airport, Ibiza airport, Palma de Mallorca, and London Luton airport. It is the largest airport organisation in the world with regards to the number of airports managed and passenger volumes: in May 2022, over 22 million passengers flew through Aena's network of airports[61].

Aena views its expertise as important for success in being invited to bid for airport acquisitions and concessions in Europe and around the world. Having a large network, Aena is able to spread best practice across its airports (within Europe and further afield) to build its expertise. With many airports in its network, it is more likely for connections to be made between airports facing similar issues, and for specific expertise to be shared across these airports. Moreover, Aena has a larger range of airports to run more accurate testing of specific approaches. As innovation and best practice is shared across its networks, its airports develop and are able to compete more effectively. This both improves Aena's reputation, thereby increasing its chance of being invited to bid for future opportunities and provides Aena with a competitive advantage in those future competitions.

Example of innovation spreading is the facial recognition pilot project run at Madrid, Barcelona and Minorca airports, which uses biometrics to improve the customer's airport experience, whilst eliminating all physical contact. This pilot project has been successful and will be extended[62]. Another example is London Luton Airport's innovative handling equipment pooling system[63] which was adapted for use in other airports within Aena's network starting with Palma de Mallorca, where it was also successful.

In addition to the spreading of best practice creating a competitive advantage in future competitions, Aena also enables its airports to compete with other airports more effectively for airline services. As a large airport network, Aena has good relationships with several airlines, which can be used to improve newer airports in its network, for example through facilitating access to these airlines at routes or slots conferences.

This case study, therefore, illustrates how the market for corporate control aids airport competition in two ways. Firstly, through the spread of innovation and best practices through trials and pilots, which provides Aena with a competitive advantage in future bids. Secondly, by facilitating better airport-airline negotiations thus enabling each airport in the network to compete for airline services more effectively.

[60] Aena (2022). Available at: https://www.aena.es/en/corporative/corporative.html (Accessed 26 July 2022).

[61] Aena (2022). Available at : https://www.aena.es/en/press/airports-in-the-aena-network-close-the-month-of-may-with-more-than-22.2---million-passengers.html&p=1575076641928 (Accessed 26 July 2022).

[62] Aena (2022). Available at: https://www.aena.es/en/press/facial-recognition-pilot-project-at-madrid-airport-to-be-extended-for---contactless-passenger-experience.html (Accessed 26 July 2022).

[63] International airport review (2017) *London Luton Airport unveils innovative equipment pooling system.* Available at : https://www.internationalairportreview.com/news/34221/london-luton-equipment-pooling/ (Accessed 26 July 2022).

VINCI AIRPORTS

VINCI Airports is a private airport operator, operating more than 50 airports across 12 countries. Examples in Europe include London Gatwick airport, Rennes Bretagne airport in France, Lisbon airport in Portugal, and Belfast International airport in Northern Ireland. VINCI Airports develops, finances, builds and provides everyday operation of these airports.

Being a long-term investor, VINCI Airports is committed to sustainably developing each of its airports, both for the success of that airport but also because its reputation is important for future acquisitions. This is illustrated by Nicolas Notebaert, the CEO of VINCI Concessions, and Chairman of VINCI Airports: "If public authorities entrust management of their airports to us it is because we have demonstrated, project by project, our capacity to anticipate, finance and guide the investments required to create lasting value."[64]

In addition, VINCI Airports has a bespoke approach to developing its airports, allowing airports to individually grow by providing airports with their own commercial freedom (for example, there are no group-wide contracts with airlines or other suppliers) but enabling airports to learn from each other, including on attracting and retaining airlines. This allows for the exchange and spread of best practice across airports. VINCI Airports fosters this through networking and training sessions.

This case study of VINCI Airports therefore demonstrates clearly how the market for corporate control reinforces the competitive dynamics outlined earlier in this section on competition for airline services, provides airport groups that are active in this market with additional incentives to develop the airports they own/control given the wider benefits of a proven track record in successfully developing airports and the role of corporate control in spreading innovation and best practice across the airport sector.

In summary, this section has, so far, examined the ways airports compete with each other. While we have identified these as individual mechanisms it is important to recognise that the resulting competitive constraints on airports come from the cumulation of these factors. Indeed, the overall impact may be greater than the sum of the parts as individual factors interact with and reinforce each other

4.5 MARKET OUTCOMES

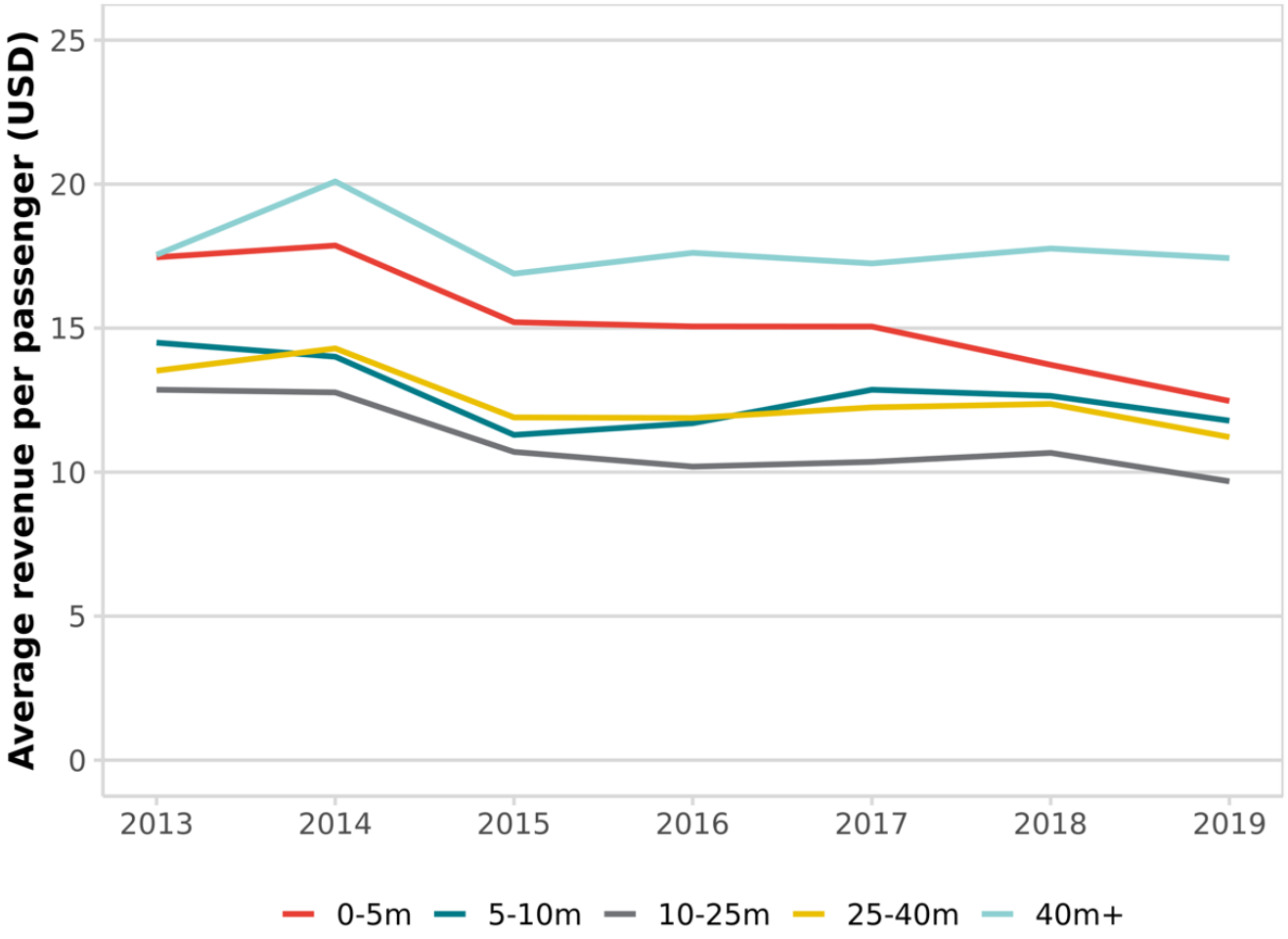
Having examined the data on ways airports compete with each other, in this section we turn to market outcomes and examine if these are consistent with a competitive market. Larger airports in Europe are often subject to economic regulation which controls the prices and quality offered, and these findings will reflect the outcome of regulation at those airports, as well as competition. In particular, we focus on (i) airport charges and (ii) airport service quality. We find that the trends in these areas are consistent with a competitive airport market in Europe. When combined with the conclusions in the sections above, this points to significant competition in the European market.

[64] VINCI Airports (2022). Available at: https://www.vinci-airports.com/en/global-operator (Accessed 26 July 2022).

4.5.1 CHARGES

Figure 32 below shows how average aeronautical revenue per passenger has evolved over time, by airport size category.[65] It shows that for most airport size categories, aeronautical revenue stayed fairly stable between 2016 and 2019. This shows that for most airport size categories, airport charges (in real terms) have stayed the same or decreased. For example, for smallest airports, (real) aeronautical revenues per passenger decreased by 17% between 2016 and 2019. This is consistent with the existence of competitive pressures.

FIGURE 32 REAL AERONAUTICAL REVENUE PER PASSENGER REMAINS FAIRLY CONSTANT



Source: Frontier analysis of ATRS data

Note: This chart shows average (weighted by passengers) aeronautical operating revenue per passenger across airports in each size category (USD) over time from 2013 to 2019. Revenue is adjusted for inflation. As the source data is provided in US Dollars, we used US inflation from the World Bank and set 2013 as the base year to calculate the price index to adjust for inflation. We then divided the nominal revenue by the price index to calculate real revenue. This chart is based on 56 airports in Europe. All airports with NA in revenue or passenger data have been removed.

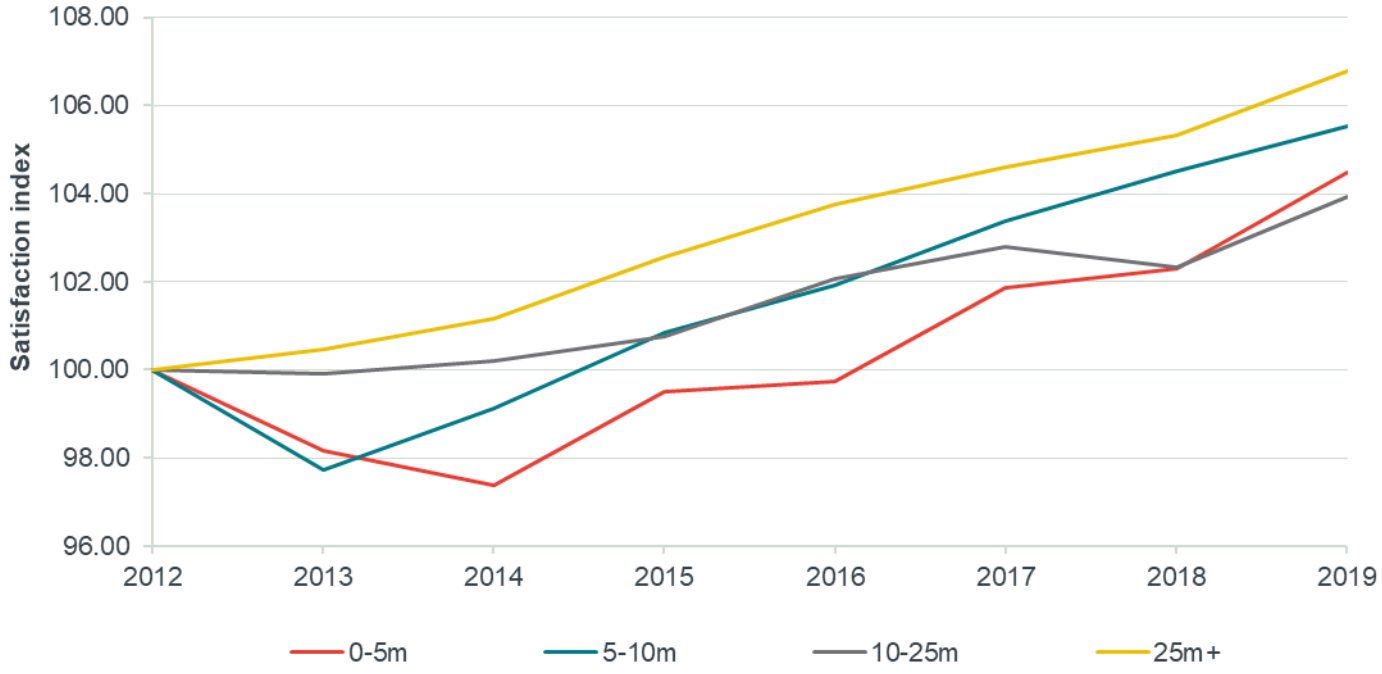
4.5.2 SERVICE QUALITY

Despite airport charges not increasing, on average, the service quality offered by airports to customers has risen from 2016 to 2019 (Figure 33). Airports of all size categories have had similar increases by about 3-

[65] The largest airports in Europe are subject to economic regulation which affects the prices and quality offered, and these findings will also reflect, to some extent, the outcome of regulation at those airports, as well as competition.

4% in service quality. This points towards increasing competitive pressures among airports to attract and retain airlines and passengers.

FIGURE 33 OVERALL CUSTOMER SATISFACTION SCORES HAVE INCREASED OVER TIME



Source: Frontier analysis of ACI data.

Note: This chart shows the change in overall satisfaction scores by airport size category, over time from 2012 to 2021. Satisfaction scores are indexed with 2012 scores benchmarked as 100.

The next quote provides an example of an airport responding to the development of competition by responding to the needs and preferences of their customers, across aspects directly experienced by passengers (the service in the terminals) and indirectly experienced by passengers but of importance to airlines (airfield operations).

"WE WILL CONTINUE TO DEVELOP THE AIRPORT TO MEET THE NEEDS OF OUR AIRLINES AND PASSENGERS WITH IMPROVEMENTS TO THE WAY WE OPERATE ON THE AIRFIELD AND THE SERVICE WE OFFER IN OUR TERMINALS." [66]

GATWICK AIRPORT

Airports investing in response to the preferences of their customers is illustrated in the quote below.

[66] From ACI EUROPE (2020) *Gatwick Airport to invest €1.26bn in new five-year plan.* Available at: http://www.airport-business.com/2017/08/gatwick-airport-to-invest-1-15-billion-in-five-year-plan/ (Accessed 26 July 2022).

"THE LATEST INVESTMENT WILL SIGNIFICANTLY TRANSFORM THE EXPERIENCE FOR CUSTOMERS, OFFERING MORE CHOICE AND QUALITY IN MODERN, WELCOMING SURROUNDINGS."[67]

CARDIFF AIRPORT

These quotes provide some colour on the statistical evidence presented above on the increase in service quality observed across all size categories of airport since 2016.

[67] From ACI EUROPE (2017) *Cardiff Airport 'transforming customer experience' with €4.5m investment*. Available at: http://www.airport-business.com/2017/10/cardiff-airport-transforming-customer-experience-e4-5m-investment/(Accessed 26 July 2022).

5 RESPONSES TO THE COVID-19 PANDEMIC

SUMMARY

The Covid-19 pandemic resulted in very large reductions in the volume of air traffic. This section shows that throughout the pandemic, airports sought to manage costs, increase revenues and access additional finance. These activities are consistent with the approach adopted by organisations in other parts of the economy, including particularly businesses in the **travel**-related areas of airlines and hotels. In addition, there is evidence from airport case studies of airports investing in customer relationships in the expectation of those being a source of competitive advantage when demand returns.

While the industry is still at the relatively early stages of recovery from the Covid-19 pandemic, competition between airports appears to be reasserting itself, particularly driven by competition for airline services.

COMPETITION FOR AIRLINE SERVICES

The evidence (from a survey of ACI EUROPE members conducted for this study, data on airline schedules, and information in the public domain) from the years following 2019 shows the following :

- Leisure passengers make up an increasing share of passengers. This increases the competitive pressure on airlines, and thus airports, as leisure passengers are more price sensitive, and also more likely to use LCCs which are generally more flexible than FSCs.
- As suggested by the point above, LCCs make up an increasing share of flights. As of June 2022, low-cost carriers represented 38% of all flights to, from or within Europe; this is about 5 percentage points higher than their share in 2019, pre-pandemic.
- Short-haul traffic makes up an increasing share of flights. This is in part due to a combination of both points stated above, but also due to travel restrictions in some parts of the world.
- The top five airlines by capacity have an increasing share of seats every year, increasing the buyer power of these airlines.
- Many routes were changed following 2019. In 2021, over 35% of routes flown by airlines to, from and within Europe did not exist in 2019. These route changes are driven primarily by LCCs; in 2022, 941 routes flown by Ryanair did not exist in 2019.
- Airlines are working to shorter planning horizons than was the case before the pandemic. This means they are more flexible in shifting capacity. As a result, airlines are also negotiating harder for discounts.

The previous section outlined how indicators of airport competition evolved from 2016 to 2019, illustrating how airport competition remained at a high level. The onset of the Covid-19 pandemic in 2020 resulted in dramatic changes across society. Within the aviation industry, domestic and international

passenger flights nearly ceased almost immediately, with passenger volumes declining from approximately 210,000 flights per day in April 2019 to less than 30,000 flights per day in April 2020[68].

However, this unprecedented shock provides an opportunity to understand how airports reacted to maintain their businesses (section 5.1) and how that compares to other sectors of the economy (section 5.2). As the aviation industry recovers, we can also examine how airports are experiencing that recovery and how airlines are using the internationally mobile nature of their assets to change their networks as the industry restarts: these factors give us a new perspective on how airport competition may evolve over the coming years.

This section is built on a survey of ACI EUROPE's members, a comparison of publicly available material on different companies' responses to the Covid-19 pandemic, interviews with Munich Airport and Swedavia and further analysis of airline schedules data.

5.1 HOW DID AIRPORTS RESPOND TO THE COVID-19 PANDEMIC?

Frontier Economics surveyed ACI EUROPE's members on their experiences during the Covid-19 pandemic. There were 30 responses in total, 21 airports and 9 airport groups, covering a wide range of sizes and geographic locations of operations. In 2019, the surveyed airports covered 52% of total traffic (in seats) in Europe[69]. In this section, we outline the mechanisms that airports used to manage costs, increase revenue where possible, and access additional finance to continue their business: the picture that emerges is one of airports using every lever at their disposal to manage their business, as would be expected of organisations operating in commercial circumstances. In this context, it is notable that relatively few airports received airport-specific government funds that were not available to all parts of the economy.

5.1.1 MANAGING COSTS

Airports managed their costs through operational adjustments and receiving government support.

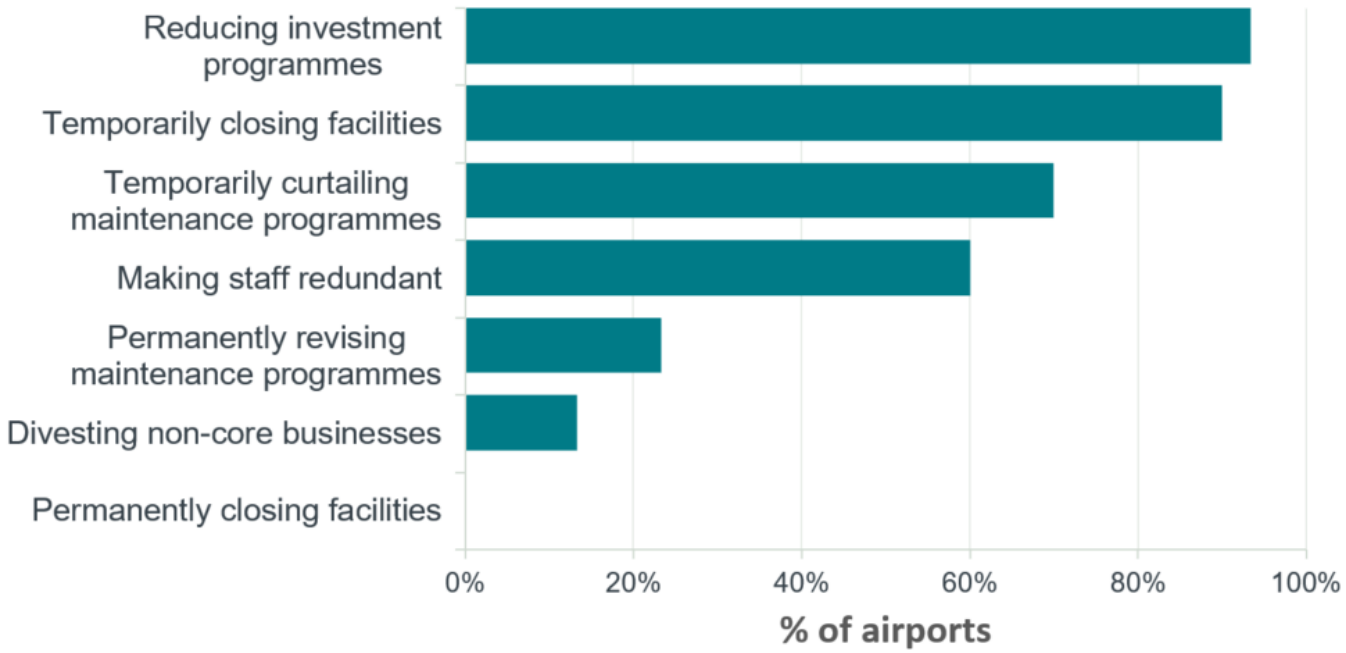
OPERATIONAL ADJUSTMENTS

Airports made a range of temporary and permanent operational adjustments in order to reduce their cost base, shown in Figure 34. This was primarily done through reducing investment programmes and temporarily closing facilities, with almost all airports taking these measures. The temporary curtailment of maintenance programmes was also a common, albeit secondary, measure. Some airports used the pandemic to make permanent changes to their operations by making staff redundant (while some of these staff may be rehired as demand returns, it is likely that some of the staff made redundant will not be rehired) and permanently revising their maintenance programmes to achieve increased efficiency.

[68] Eurocontrol (2022) *COVID-19 impact on the European air traffic network*. Available at: https://www.eurocontrol.int/covid19 (Accessed 26 July 2022).

[69] That is, traffic to, from and within Europe. Traffic to or from the surveyed airports was over 867 million seats in 2019.

FIGURE 34 OPERATIONAL ADJUSTMENTS MADE BY AIRPORTS (2020-2021)

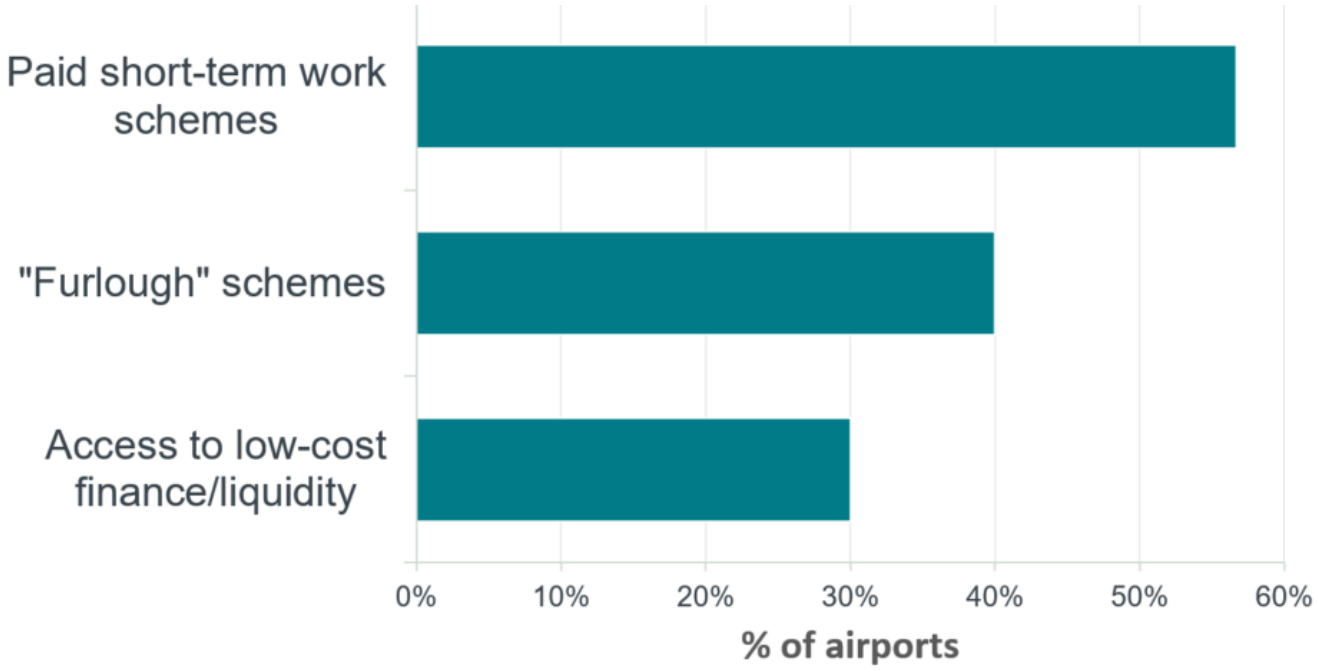


Source: Frontier Economics.
Note: N=30

GOVERNMENT SUPPORT SCHEMES

In addition to reducing their cost bases by taking their own actions, most airports used government support schemes offered widely by most countries as a response to the pandemic. 29 of 30 respondents made use of government support schemes during 2020 and 2021. The most commonly adopted of these were paid short-term work schemes, where employees worked shorter hours but with government contributions towards the cost of those employees. Some airports participated in "furlough" schemes, where employees were paid a proportion of their wage whilst not working and much of this cost was picked up by the government. Some, although not many, airports took access to low-cost finance/liquidity provided by the government. Many airports engaged in more than one government support scheme, including some not listed in Figure 35.

FIGURE 35 GOVERNMENT SUPPPORT SCHEMES USED BY AIRPORTS (2020-2021)



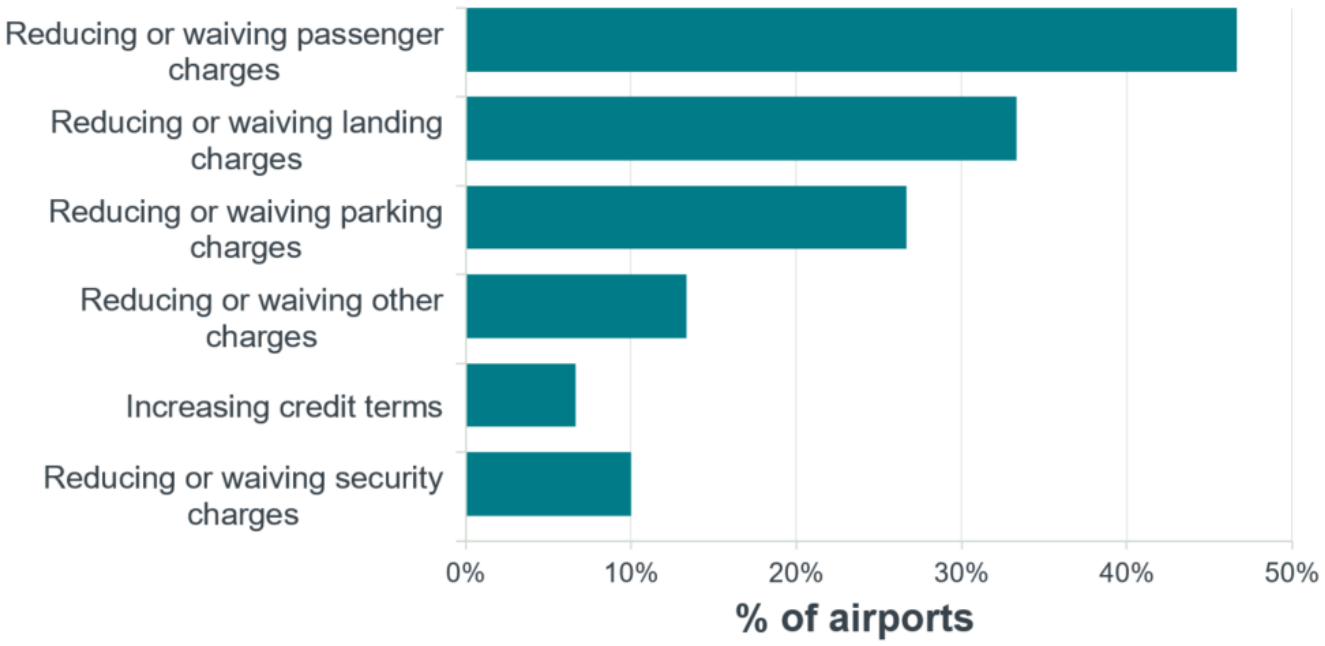
Source: Frontier Economics.
Note: N=30.

This shows how airports reduced their cost base using all the mechanisms available to them.

5.1.2 INCREASING DEMAND: RECOVERY INCENTIVES

Reductions in airports' cost bases were often followed up with offering Covid-19 recovery incentives to airlines to ensure passenger numbers, the industry more widely, and therefore airport revenues, recovered as quickly as possible. Two-thirds of respondents provided Covid-19 specific recovery incentives to airlines. Figure 36 shows that the most common incentives included reducing or waiving passenger, landing and parking charges. Given the importance of marginal passengers to airports, it is unsurprising that airports engaged in these types of incentives to encourage airlines to increase flights and therefore passenger numbers.

FIGURE 36 RECOVERY INCENTIVES PROVIDED BY AIRPORTS TO AIRLINES (2020-2021)



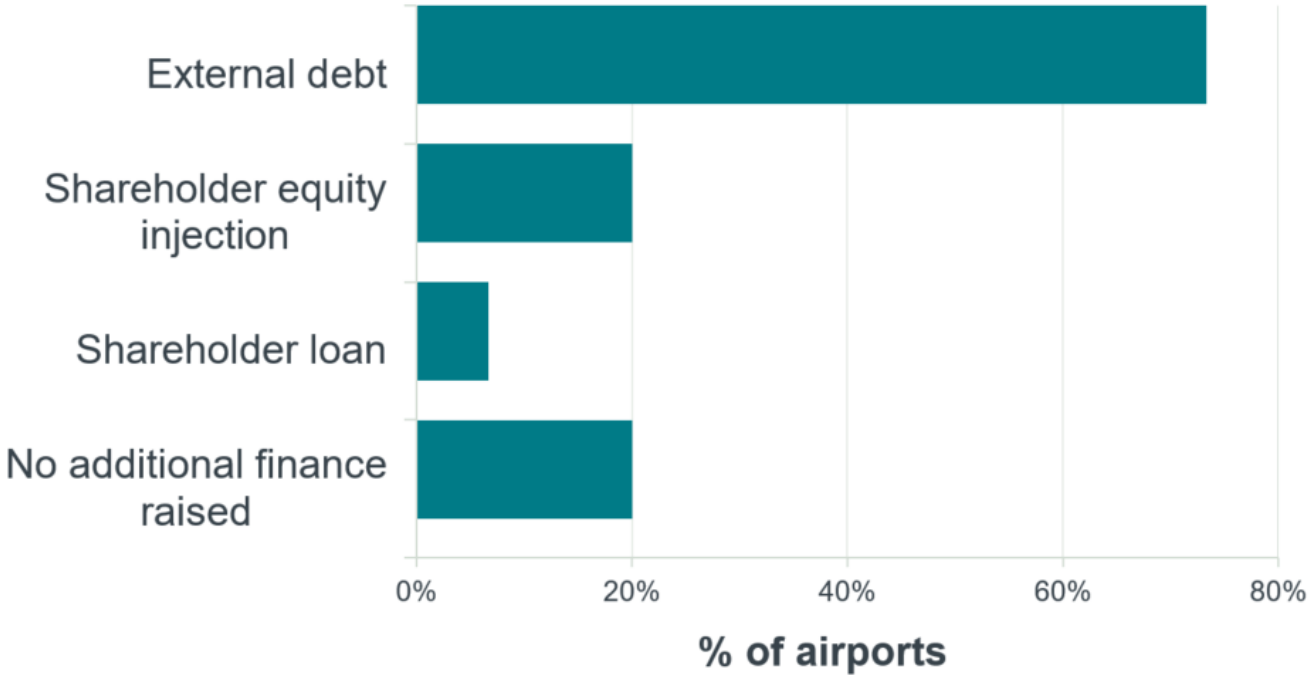
Source: Frontier Economics.
Note: N=30.

Approximately one third of airports did not offer recovery incentives to airlines: the reasons for this are unclear, but it may be due to a belief that airlines were not responding to cost-based incentives at that time and that the key factor limiting traffic was passenger demand to travel or the existence of incentive schemes pre-Covid or the inability to publish a scheme and obtain approval from an economic regulator. Travel restrictions were evidently a significant determinant of passenger demand (or the lack of), and therefore reducing airport charges may have been an ineffective way of stimulating demand.

5.1.3 RAISING ADDITIONAL FINANCE

Despite the measures taken by airports, 22 out of 30 airports reported raising additional finance in 2020 or 2021. As indicated in the Figure 37 below, all 22 of these airports raised external debt, whilst 6 also raised additional finance from their owners through an equity injection or shareholder loan.

FIGURE 37 ADDITIONAL FINANCE RAISED BY AIRPORTS (2020-2021)



Source: Frontier Economics.
Note: N=30.

This sub-section has shown that during the pandemic airports engaged in significant activities to manage costs, increase revenues and access additional finance. The next sub-section puts this activity in context by comparing the approaches adopted by two airports with the approaches adopted by firms in other, travel-related sectors of the economy.

5.2 COMPARING AIRPORTS TO OTHER SECTORS

This section presents a cross-sector review of case studies which document how the Covid-19 pandemic affected the finances of different organisations, and how they managed their revenues and costs in response.

For the purposes of this review, we have identified sectors (and organisations) within the transport and hospitality industries, to ensure relevance and comparability across the key themes that emerge. As such, this section is not positioned as an exhaustive review of the response to the Covid-19 pandemic, but as representative examples to compare and contrast how these specific types of organisations managed their finances to minimise the impact of the pandemic.

In particular, we have identified five case studies, chosen to provide a comparison across a range of industries and geographic areas, as set out in Table 6 below.

TABLE 6 COVID-19 RESPONSE CASE STUDIES

ORGANISATION	TYPE OF ORGANISATION	LOCATION	SIZE
Munich International Airport	Airport	Munich, Germany	47.9 million passengers
Swedavia Airports	Airport	Multiple, Sweden	40.1 million passengers
KLM Royal Dutch Airlines	Airline	Netherlands	35.1 million passengers
SNCF	Rail infrastructure manager	France	5 million rail passengers per day
Hilton Hotels	Hotel	Multiple	~1 million rooms

Source: Organisation annual reports
Note: The 'Size' column provides annual data from 2019, before the Covid-19 pandemic

More detail on the case studies is provided in Annex 2. The case studies provide a brief introduction to each of the five organisations and their key business activity. They then compare its revenues and costs during the Covid-19 pandemic to those before the pandemic, and highlight the key steps taken by each organisation to mitigate its impact.

This sub-section summarises the similarities and differences between the measures taken by the different organisations.

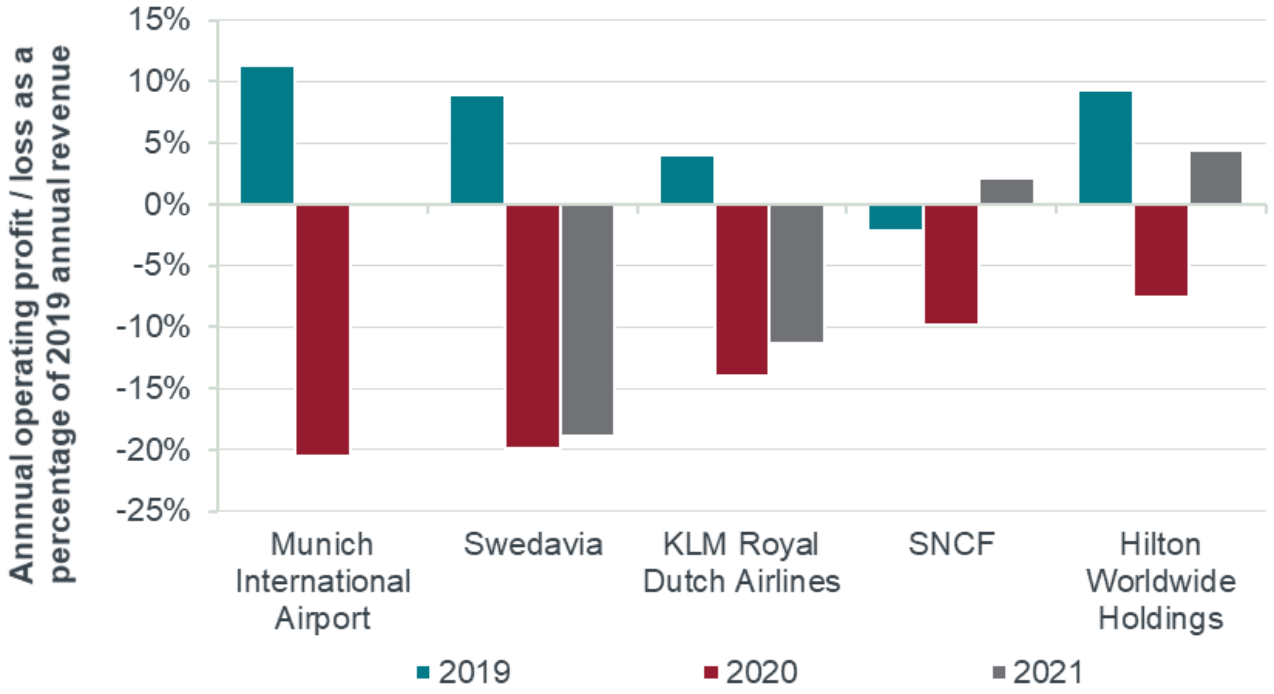
5.2.1 KEY THEMES AND SIMILARITIES ACROSS THE CASE STUDIES

This section highlights, based on the case studies identified above, some of the key impacts of the Covid-19 pandemic on the financial performance and operations of five organisations and how they responded to the different challenges posed by Covid, to manage their costs and revenues.

As documented in the previous subsection, the global scale of the Covid-19 pandemic and the ensuing travel restrictions greatly reduced demand in the aviation, rail, and hospitality industries. This gave rise to significant revenue downturns for each of the organisations considered, to the extent that they all recorded an operating loss in 2020, the first year of the pandemic.

As the pandemic continued into 2021, the financial performance of these entities in 2021 showed some variation. Figure 38 below provides an overview of the operating profit/loss, as a proportion of 2019 revenue, for each of the organisations over 2019-2021.

FIGURE 38 ALL ENTITIES MADE LARGE LOSSES IN 2020 BUT PERFORMANCE IN 2021 IS MORE VARIABLE



Source: Organisation Annual Reports
Note: Operating profit/loss for the five entities over 2019-2021. Munich International Airport has not published its 2021 Annual report

The figure shows that all five organisations recorded an operating loss in 2020. However, while all organisations were able to improve their financial performance in 2021, KLM Royal Dutch Airlines and Swedavia Airports continued to make an operating loss, while SNCF and Hilton Worldwide Holdings were able to make positive profits (financial results for Munich International Airport are not yet available as this report is produced). In the case of SNCF, 2021 revenues were almost back to the pre-pandemic 2019 levels.[70]

SNCF's revenues over the last three years suggest that a key factor behind its comparatively large recovery in 2021 was its ability to recover almost all of the passenger traffic it had lost in 2020. In other words, the impact of the pandemic and the ensuing travel restrictions appear to have been more short-lived for SNCF's rail passengers, compared to the other organisations considered in this review, which primarily operate in the aviation sector[71]. A caveat to this is that SNCF benefitted significantly from state-aid and domestic travel not being subject to travel restrictions.

On the other hand, Hilton suffered a continued downturn in its revenue over 2020 and 2021. However, like SNCF, it was able to return to positive profits by 2021. As per the financial figures, Hilton was able to increase revenues by 30% from 2020 to 2021 (but still 43% below 2019 levels), while only increasing

[70] The total revenues in 2021 (€34,572m) were only 1.5% below the 2019 levels (€35,120m).

[71] This is likely because domestic travel has been less impacted by pandemic travel restrictions, compared to international travel. SNCF also receives significant amount of state payments for public service routes. Moreover, The French government partially assumed SNCF's debt and agreed to pay 4.05bn Euros of state aid in instalments, starting in 2021, as part of the 'Rail Recovery Plan' (https://medias.sncf.com/sncfcom/finances/Publications_Groupe/PR_SNCF_GROUP_2021_Results.pdf).

expenditure by 1%. This suggests that Hilton's recovery was driven primarily by tight cost control, as opposed to increased demand.

Finally, the performance of the three organisations in the aviation industry (Munich International Airport, Swedavia, and KLM), seems more closely aligned to the Hilton case, than the SNCF case. In particular, all three organisations undertook several cost-cutting measures in 2020, and continued to do so in 2021. However, given the continued suppression of global demand for air travel, the lower costs were still insufficient to make up for the significantly lower revenues, as a result of which, they continued to make a loss in 2021.

Additionally, given the diverse portfolio of activities and operations undertaken by the SNCF group and Hilton Worldwide Holdings, they may have been able to better absorb the travel impacts of the Covid-19 pandemic.

MANAGING REVENUES AND COSTS IN THE COVID-19 PANDEMIC

This section summarises the types of approaches adopted by the different organisations to manage their costs and revenues over the Covid-19 pandemic, and identifies the key similarities and differences across the five case studies. Figure 39 below sets out the high-level categories of responses and provides further detail on how each of the organisations undertook measures under each category.

The figure highlights some important trends:

- The three organisations in the aviation industry (Munich International Airport, Swedavia, and KLM) developed long-term reorganisation plans to restructure the organisation into smaller, more efficient entities to counteract the effects of the pandemic. Hilton temporarily furloughed a proportion of its staff, and reduced salaries. SNCF, in contrast did not undertake this restructuring exercise and made positive profits in 2021, without reducing its workforce.
- While the airports and the airline significantly scaled down their operations (including temporarily closing down airports, and reducing schedules), SNCF and Hilton continued expanding their business and adding new services and hotels respectively.
- All five of the entities undertook short-term prioritisations, postponing or cancelling non-critical investments and undertaking measures to increase short-term liquidity.

Our survey and the case studies above show that airports acted as would be expected from organisations in a competitive industry in response to the Covid-19 crisis. They used the experience of the pandemic to increase their efficiency and prioritised maintaining relationships with their customers while using every available mechanism to safeguard their businesses.

FIGURE 39 A SUMMARY OF THE RESPONSE TO THE COVID-19 PANDEMIC BY THE FIVE ORGANISATIONS CONSIDERED IN THIS REVIEW

	MUNICH INTERNATIONAL AIRPORT	SWEDAVIA	KLM ROYAL DUTCH AIRLINES	SNCF GROUP	HILTON WORLDWIDE HOLDINGS
Adjusting operations	Temporarily closed down some of its facilities	Reduced operations in all airports	Reduced schedule to skeleton network	Launched new services	Continued to open hotels and expand development
Organisational restructuring	Launched projects to shrink the organisation	Developed a plan to make Swedavia smaller/efficient	Plan to make itself smaller and cheaper		
Reduced workforce	Availed 'furlough' schemes; froze hiring; planned to reduce workforce	Furlough schemes for 75% of employees; announced redundancies	Ended temporary contracts; reduced hiring		Temporary furlough; salary reductions; layoffs
Managing cash/liquidity	Saved on non-priority capital expenditure	Froze non-business critical tasks; paused enhancement projects	Postponed less important projects; Renegotiated terms with suppliers; changed refund policy	Postponed or cancelled non-critical projects; Set up an extensive savings plan to boost liquidity	Halted marketing and other non-critical programmes
Divestments/sale of assets			Sold less efficient aircrafts and engines	Sold non-strategic subsidiaries	Sold subsidiary
External financial support	Took out loans to manage liquidity	Shareholder contribution from the Swedish govt.	Support from the Dutch govt.	Support from the French government	
Proactive sales policy	Provided COVID-19 recovery incentives	Offered rent relief to tenants; Provided COVID-19 recovery incentives		New fares and sales policy saw high rebound rates	

Note: Based on annual reports. This summary is not an exhaustive list. For each type of response or measure adopted by the organisations, the yellow boxes represent consistent responses by the different organisations and the red boxes represent dissimilar responses

5.3 HOW HAS THE PANDEMIC AFFECTED AIRPORT COMPETITION?

So far, this section of the report has focussed on how airports responded to the Covid-19 pandemic (section 5.1) and how the actions of airports compared with other sectors of the economy (using case studies in section 5.2). These sections highlighted the efforts made by airports to manage all aspects of their businesses through the pandemic by managing costs, increasing revenue where possible and accessing liquidity. However, with very few passengers and airline services effectively resulting in a dormant market, there was very little competition through the height of the pandemic: as passenger volumes and airline services return, the mechanisms of airport competition are reasserting themselves. It is therefore informative to consider the early evidence on how airport competition is developing in this stage of the aviation industry recovery.

Airports have been left with higher debts and more spare capacity (at least temporarily). This sets a backdrop for much greater competition between airports to recover their revenue. The following section will explore how the pandemic has affected the mechanisms of airport competition set out in section 2.

COMPETITION FOR AIRLINE SERVICES ON NEW AND EXISTING ROUTES

Our survey of ACI members explored the changes that airports are experiencing as growth returns to the industry.

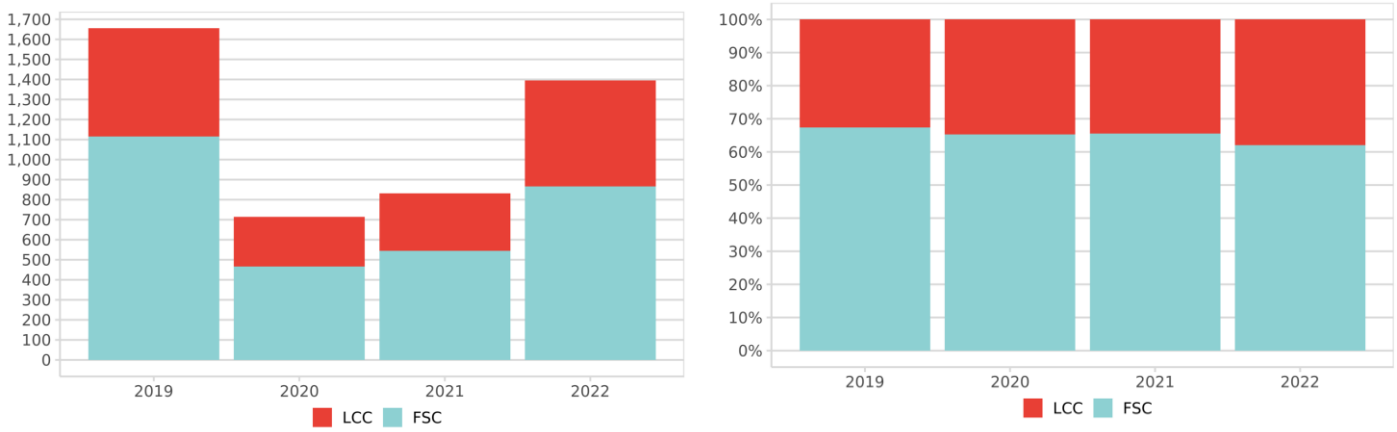
One common trend amongst their responses is that leisure passengers are making up a greater proportion of passengers than was the case pre-pandemic. This implies a reduction in the proportion of passengers travelling on business, which is a continuation of a trend in pre-pandemic passenger surveys across Europe (see Table 4). Leisure passengers are typically more price sensitive than business passengers.[72] This implies that the industry as a whole is likely to be more price sensitive and increasingly footloose going forward, which is likely to increase the pressure from airlines on airports to minimise airport charges and increase their bargaining power[73]. A shift towards leisure travel may also change the routes airlines want to offer their customers as previously profitable routes may become unprofitable as demand patterns change. Therefore, the increase in the proportion of leisure passengers is likely to result in greater competition for airline services on both new and existing routes.

In addition (and potentially linked) to this change in passenger mix, LCCs represent a greater proportion of total traffic than was the case pre-pandemic. As Figure 40 below shows, in the return to pre-pandemic flight levels, low-cost carriers represent an increasing share. As of June 2022, low-cost carriers represented 38% of all flights to, from or within Europe; this is about 5 percentage points higher than their share in 2019, pre-pandemic. This change was also reported by airports in the survey. As demonstrated in section 4.1, LCCs typically have greater ability to shift capacity than FSCs, and regularly do. This further increases the risk to airports of airlines moving capacity, thus increasing competition for airline services on both new and existing routes.

[72] See, for example, Intervistas (2007) *Estimating air travel demand elasticities*; and Department for Transport (2022) *Econometric models to estimate demand elasticities for the National Air Passenger Demand Model*. P. 23.

[73] This is in addition to the already high pressure from airlines in order to restore their financial positions.

FIGURE 40 LOW-COST CARRIERS REPRESENT AN INCREASING SHARE OF TRAFFIC POST-PANDEMIC



Source: Frontier analysis of OAG data.

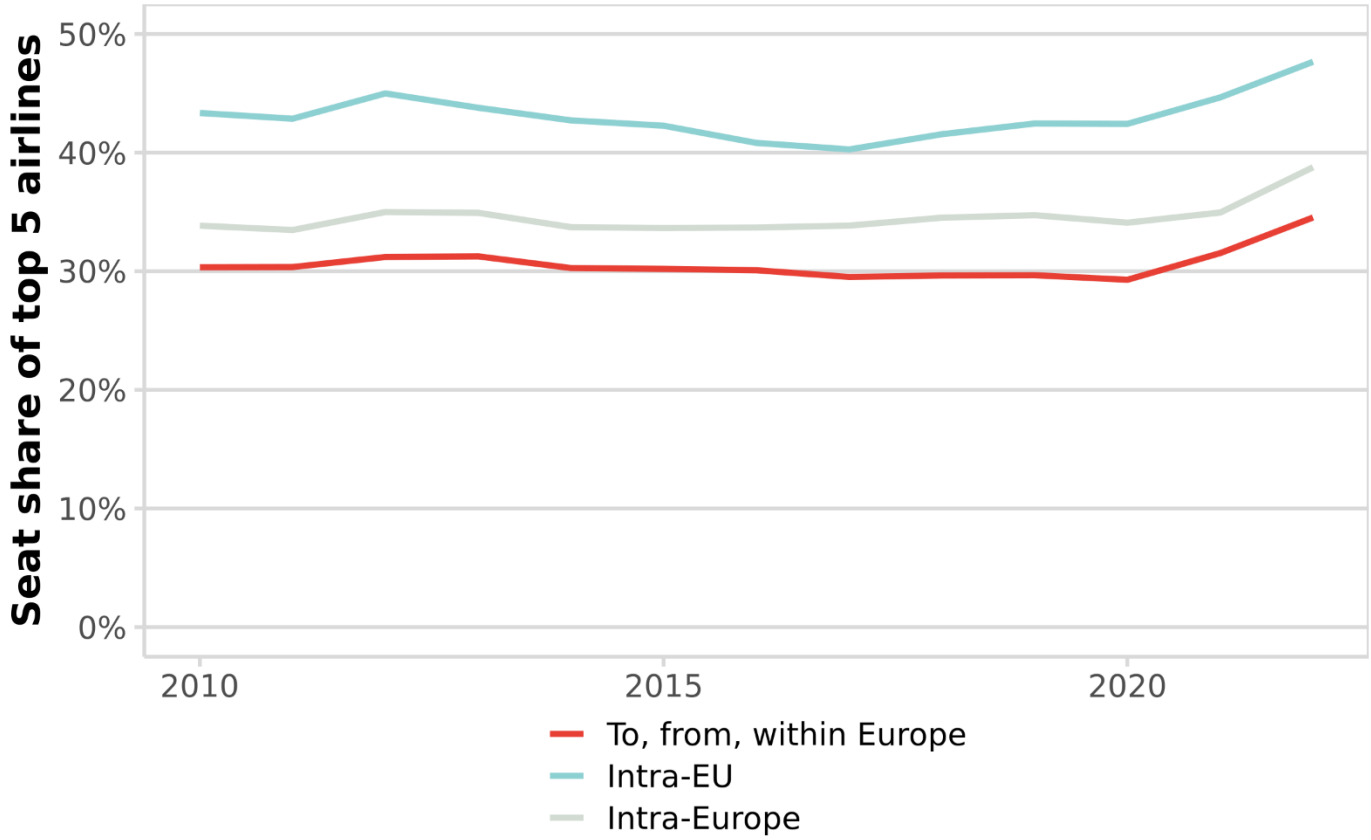
Note: LHS: This chart shows the total seats (million seats per annum) from 2019 to 2022 (as of 1st June 2022), by airline type. RHS: This chart shows the share of total seats from 2019 to 2022 (as of 1st June 2022), by airline type. LCC and FSC are classified according to OAG definitions. Europe is defined as every country with at least one airport which is a member of ACI EUROPE. Monaco is excluded as it only has a heliport

Airports have also indicated that short-haul traffic accounts for a greater proportion of flights[74]. As LCCs focus primarily on short-haul traffic, this may explain why LCCs account for a greater proportion of total traffic in 2021 than in 2019. Customers on short-haul flights are likely to be more price sensitive, and airports are likely to face increased competition for these short-haul routes whilst long-haul traffic remains low. There is substantial uncertainty about the speed and strength of growth in long-haul traffic. This issue is explored further in the next section of the report on future trends affecting the aviation industry.

Another emerging trend post-pandemic is an increasing concentration of airline capacity. Figure 41 shows the seat share of the top five airlines in every year from 2010 to 2022 (as of June). It shows that this share increased considerably after 2020. This increases the negotiating power of these airlines.

[74] We note that at the time of writing, many important long-haul markets (like China) are still closed or subject to travel restrictions.

FIGURE 41 THE TOP 5 AIRLINES HAVE A GREATER SHARE OF SEATS POST 2020

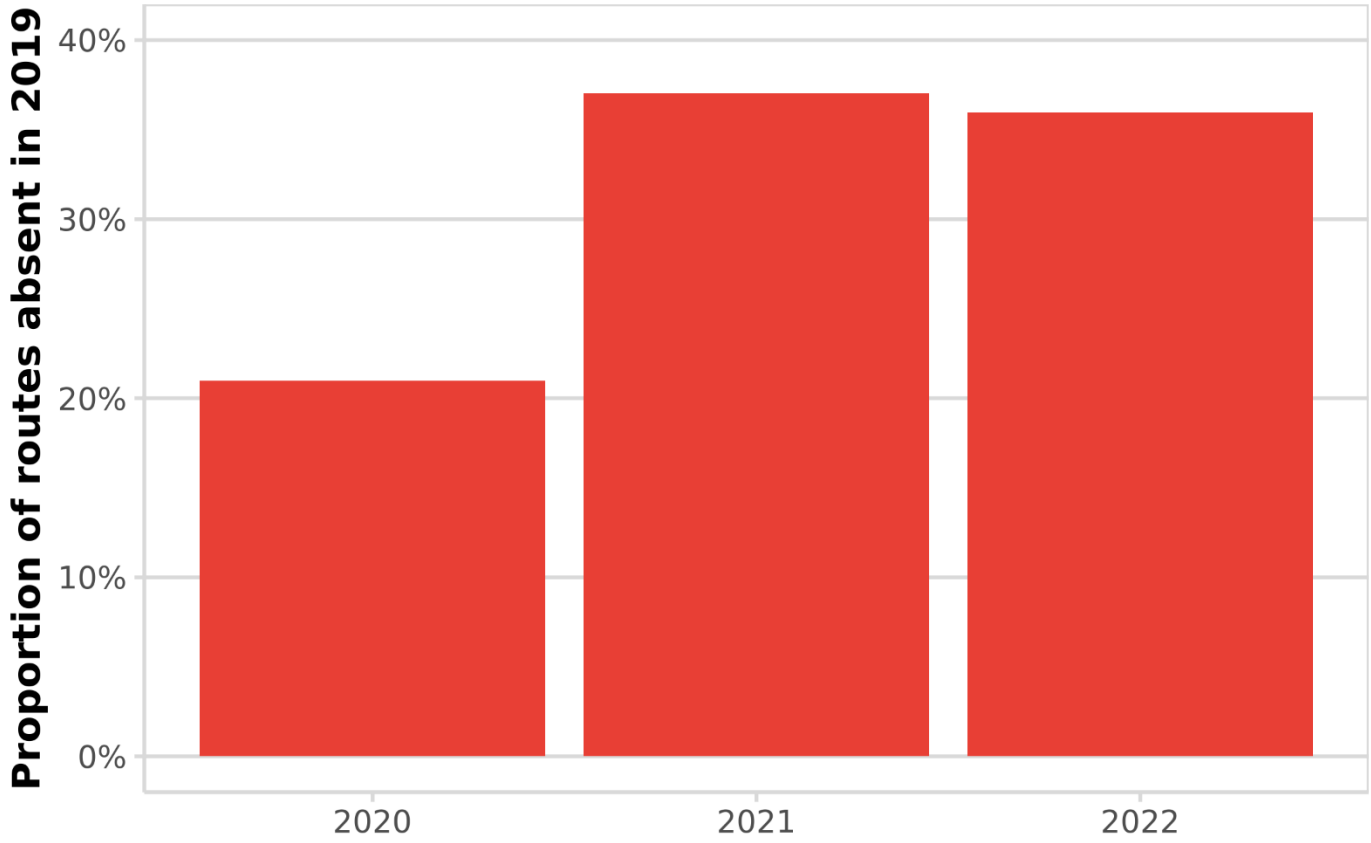


Source: Frontier analysis of OAG data.

Note: This chart shows the seat share of the top five airlines (by seats) in every year from 2010 to 2022 (as of 1st June 2022). Europe is defined as every country with at least one airport which is a member of ACI EUROPE. Monaco is excluded as it only has a heliport. Intra-Europe is defined as routes with the origin and destination within Europe, as per definition above, EU is defined as EU members, as of March 2022. Intra-EU is defined as routes with the origin and destination within the EU.

Interestingly, as the aviation industry recovers, the route networks airlines are returning to are notably different to those in 2019, pre-pandemic. Figure 42 below shows that in 2021 and 2022, more than 35% of existing routes did not exist in 2019. This emphasises the conclusions of section 4: airlines can and do change their routes, thus indicating the opportunities for airports to compete to retain existing routes, and for new routes. This trend has not dulled with the recovery from the pandemic – on the contrary, there is significant (probably increased) competition amongst airports for airline services. This is further supported by the evidence on airline and airport negotiations over the last few years, see the box later on in this section.

FIGURE 42 THE POST-PANDEMIC ROUTE NETWORK VARIES SIGNIFICANTLY TO THE PRE-PANDEMIC ONE



Source: Frontier analysis of OAG data.

Note: This chart shows the proportion of routes (in a given year) that were not present in 2019, for flights to, from or within Europe. Data excludes airlines that were formed after 2019. Data for 2022 is as of 1st June 2022. One route is defined as a service by a unique airline between a unique origin and destination. Europe is defined as every country with at least one airport which is a member of ACI EUROPE. Monaco is excluded as it only has a heliport.

Moreover, a more detailed look shows that LCCs are particularly active in driving this change in route networks. Table 7 below shows the top 5 airlines by number of routes in 2022[75] that were absent in 2019. The top three are well-known LCCs. For example, Ryanair flew over 500,000 seats on a new route (not present in 2019) between Berlin Schonefeld Airport and Palma de Mallorca Airport in 2022 (as of 1st June 2022); and Wizz Air flew over 250,000 seats on a new route (not present in 2019) between Catania Airport and Rome-Fiumicino Airport in 2022 (as of 1st June 2022). This emphasizes the previously established point that LCCs have greater flexibility to change routes and react quickly to fill gaps in the market. And as LCCs continue to drive the post-pandemic aviation recovery, airports will have to compete to attract new or retain existing routes.

[75] As of 1st June 2022. For comparison, British Airways only had 76 routes (out of 305) in 2022 that were absent in 2019. For Air France, this was 63 out of 302 routes. For Lufthansa Group, this was 53 out of 362 routes. And for KLM, 16 out of 162.

TABLE 7 LOW-COST AIRLINES HAD THE LARGEST ROUTE NETWORK CHANGES POST 2019 BUT NETWORK CARRIERS ALSO DYNAMICALLY ADJUSTED NETWORK

AIRLINE	FSC/LCC	NUMBER OF ROUTES IN 2022 THAT DID NOT EXIST IN 2019 [A]	NUMBER OF ROUTES IN 2022 [B]	PROPORTION [A/B]
Ryanair	LCC	941	2,517	37.4%
Wizz Air	LCC	474	998	47.5%
easyJet	LCC	256	989	25.9%
Corendon Airlines	FSC	200	283	70.7%
Turkish Airlines	FSC	191	628	30.4%

Source: Frontier analysis of OAG data.

Note: This table shows the top 5 airlines by number of routes in 2022 (as of 1st June) that were absent in 2019, for flights to, from or within Europe. Data excludes airlines that were formed after 2019. One route is defined as a service by a unique airline between a unique origin and destination. Europe is defined as every country with at least one airport which is a member of ACI EUROPE (a full list is in Annex 1).

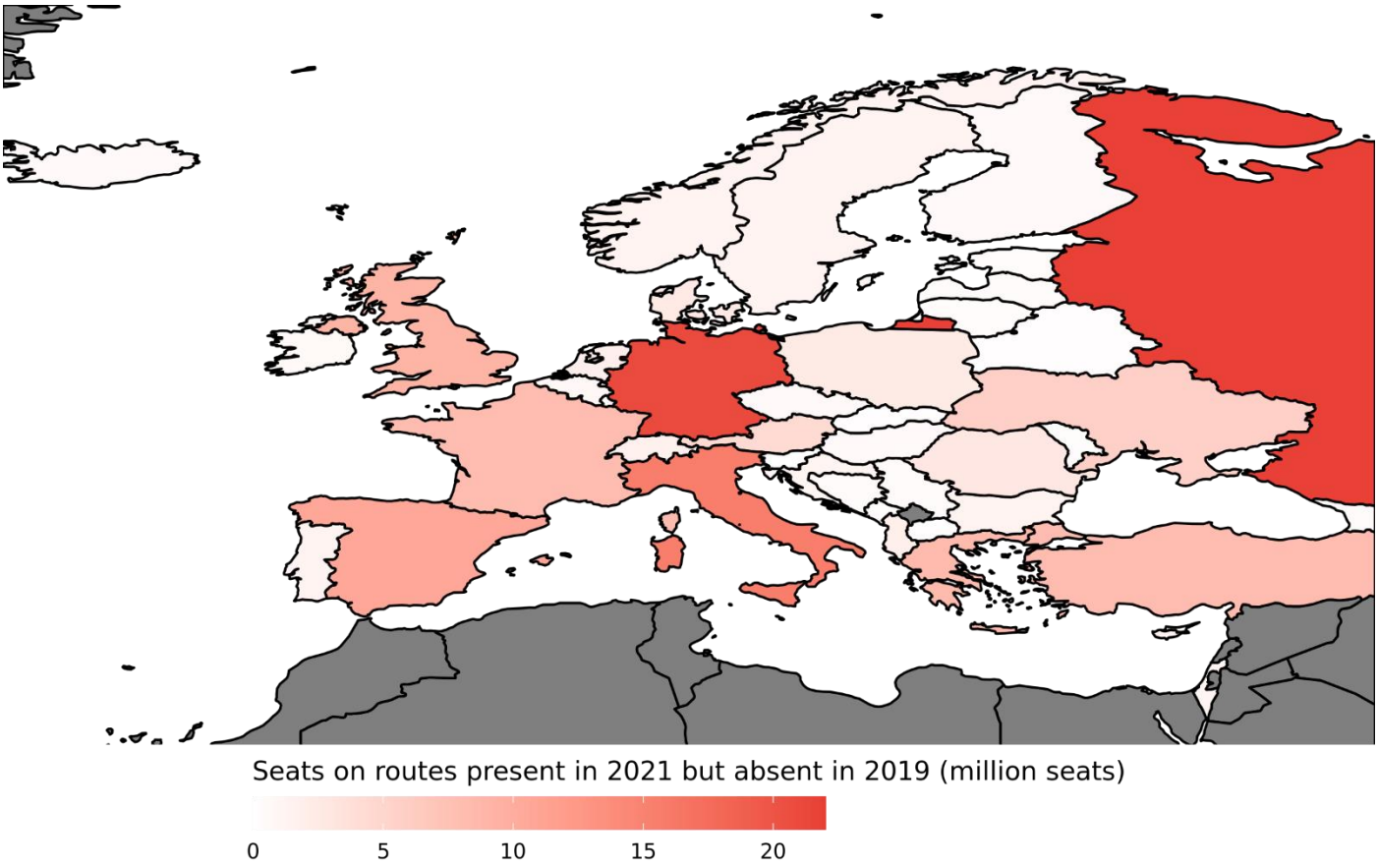
Figure 43 shows how this route network change varies geospatially across Europe. It shows the number of seats on routes that were present in 2021 but absent in 2019. Countries with the greatest change were Russia and Germany[76] (both with over 20 million seats[77]). Italy and Spain also had notable figures, both over 10 million seats.

The full-service network carriers also made significant route changes. Air France flew more flights to Greece than it ever had before, Lufthansa deployed wide-body aircrafts on flights to Spain, and BA introduced new routes from LHR.

[76] For example, in 2021, Turkish airlines flew over 105,000 seats between Cologne and Antalya, a route that did not exist in 2019.

[77] Note: Germany's route network change figures include the movement of routes from Berlin-Tegel airport (TXL) to Berlin Brandenburg airport (BER) following Tegel's permanent closure in November 2020.

FIGURE 43 ROUTE NETWORK CHANGE POST-PANDEMIC WAS CONCENTRATED IN RUSSIA AND GERMANY



Source: Frontier analysis of OAG data

Note: This chart shows the number of seats on routes (in 2021) that were not present in 2019, by country, for flights to, from or within Europe. Note: Uzbekistan not visible in chart. Data excludes airlines that were formed after 2019. One route is defined as a service by a unique airline between a unique origin and destination. Europe is defined as every country with at least one airport which is a member of ACI EUROPE. Monaco is excluded as it only has a heliport.

Another important trend which was identified in the survey is that airlines are operating to shorter planning horizons than was the case before the pandemic. This is supported by public statements from airlines, see inset box.

This gives airlines greater flexibility as to where they deploy their aircraft and therefore the actual or credible threat of moving those aircraft when negotiating with airports. This is supported by publicly available information on airlines, particularly LCCs, inviting airports to compete with each other for airline services, see the box below.

"WE'RE NOW MAKING FAR MORE IN-SEASON CHANGES THAN WE DID PREVIOUSLY. IF WE NEED TO RESPOND TO DEMAND OR TO COST INCREASES OR COST OPPORTUNITIES, WE'RE ABLE TO DO THAT NOW RATHER THAN WAITING FOR 18 MONTHS." [78]

NEIL SLAVEN
DIRECTOR OF NETWORK AND AIRPORTS, EASYJET

Figure 44 shows that some airports have experienced airlines across the board negotiating harder for discounts (compared with 2019) as services return. This is likely to be due to airlines trying to cut costs after a significant fall in their own revenues, as well as an increase in competition for airline services affording airlines greater scope for negotiating with airports across Europe. It appears that LCCs are more commonly identified as airlines which are pushing for greater discounts.

[78] From Routes (2022) *EasyJet's Seasonal Flexibility 'Here To Stay'*. Available at: https://www.routesonline.com/news/29/breaking-news/298105/easyjets-seasonal-flexibility-here-to-stay/ (Accessed 26 July 2022).

AIRLINE-AIRPORT NEGOTIATIONS POST-2019

As the aviation industry returns from the pandemic-induced shutdown, there is evidence of airlines negotiating with airports for substantial reductions in charges and explicitly inviting airports during consultations to compete with one another for airline capacity.

Based on public material, several airlines requested offers from airports with waiving of charges (including passenger, aircraft landing, baggage handling system charges and aircraft parking charges) and deferring of payments.

Beyond this, many airlines, particularly LCC airlines Wizz Air, Ryanair and easyJet, based their capacity allocation decisions on the offers made by airports[79]. Airport bidders were told not to expect capacity allocation decision to remain the same as they were pre-pandemic. These airlines stated that they were overhauling their networks in exchange for the best airport cost savings. In some cases, this has been seen in reality, for example, Ryanair closed its operations in Frankfurt Airport in 2022, citing increased airport charges as its reason: "efficient operations and competitive airport fees are key to traffic recovery post Covid and instead of incentivizing Ryanair to stay and grow, Frankfurt have opted to drive away traffic and jobs by increasing airport charges."[80]

Airports responded by offering a range of discounts. Among many others, Nuremberg airport with its "Blue Ocean Lifeline Incentive"[81] offered discounts on charges based on seat load factors for different flights. Swedavia offered a Welcome Back Package[82] for Summer 2020 and Winter 2020/2021, following consultation with airlines. This package aimed to aid market recovery. The package offered discounts on take-off and passenger charges for airlines serving both intercontinental and non-intercontinental routes.

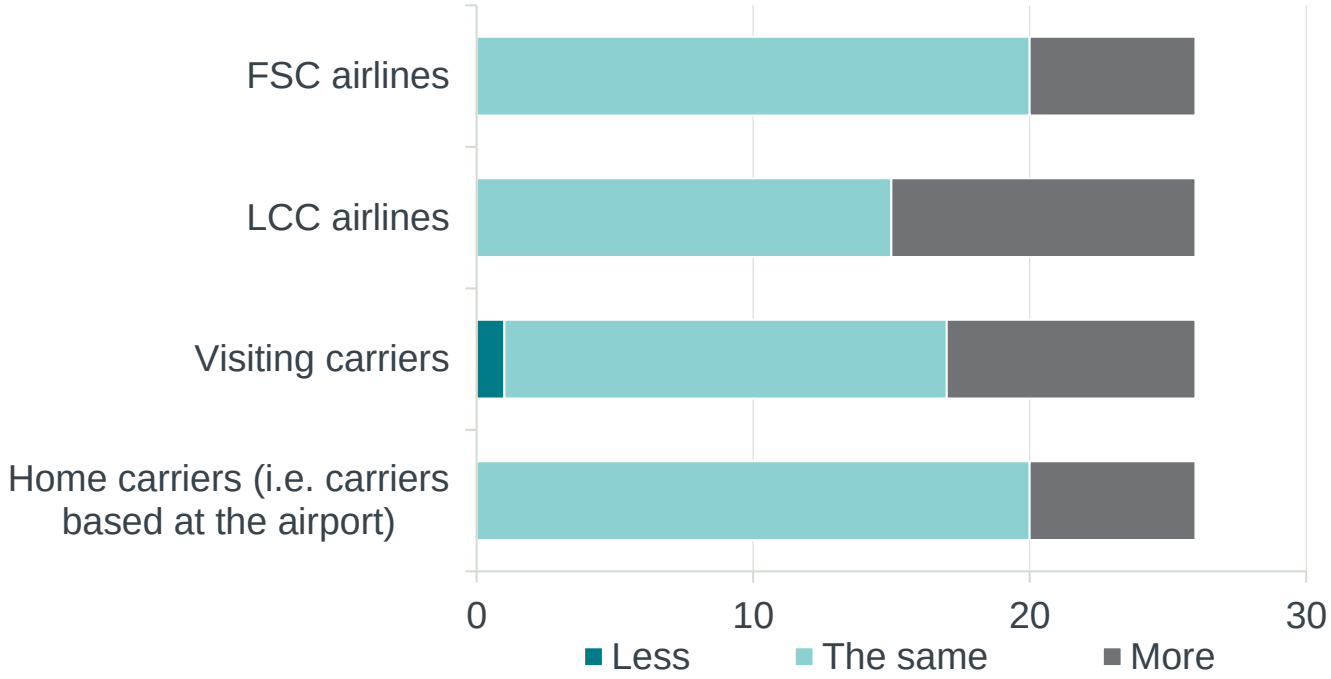
[79] Reuters (2020) *Budget airlines put squeeze on airports in coronavirus cost drive*. Available at: https://www.reuters.com/article/health-coronavirus-airlines-airports-idCNL8N2D81QZ (Accessed 26 July 2022).

[80] Aerotime hub (2022) *Ryanair to close FRA base and cancel flights, blames higher charges*. Available at : https://www.aerotime.aero/articles/29889-ryanair-close-frankfurt-main-base?utm_source=newsletter&utm_medium=email (Accessed 26 July 2022).

[81] ARGS (2020) *Nuremberg Airport implements new Blue Ocean Lifeline incentive scheme*. Available at: https://airlinergs.com/nuremberg-airport-implements-new-blue-ocean-lifeline-incentive-scheme/ (Accessed 26 July 2022).

[82] Swedavia (2020) *Swedavia introduces a Welcome Back Package 1 July 2020*. Available at: https://www.swedavia.com/about-swedavia/news/swedavia-introduces-a-welcome-back-package-1-july-2020/#gref (Accessed 26 July 2022).

FIGURE 44 AIRPORTS PERCEIVE A PROPORTION OF ALL TYPES OF AIRLINES TO BE NEGOTIATING HARDER POST PANDEMIC



Source: Frontier Economics.
Note: This chart shows airport's views on which carriers are negotiating more/less hard for discounts (Compared with 2019). N=30.

As outlined in section 2, one sign of airport competition is for airports to deliver what their customers, the airlines and passengers, want. The quote below shows that Istanbul Airport is intending to return to 2019 levels and then expand passenger volumes further by providing the best operational service to airlines and high-quality service to passengers.

" OUR FIRST TARGET IS TO REACH 2019 LEVELS AGAIN AS QUICKLY AS POSSIBLE. AFTERWARDS, OUR TARGET WILL BE TO REACH 100 MILLION PASSENGERS IN 5-7 YEARS. WE'LL DO THIS BY SETTING AN EXAMPLE OF AIRPORT OPERATIONAL EXCELLENCE AND BY ENHANCING ISTANBUL'S POSITION AT THE VERY TOP OF THE GLOBAL AIRPORTS LEAGUE. " [83]

ISTANBUL AIRPORT

A further illustration of airports acting in commercial ways is how they seek to shape and respond to market pressures is the development of new initiatives in response to changing market trends. One example is below, which shows how Brussels Airport has developed its strategy since the pandemic.

[83] From ACI EUROPE (2021) *Istanbul Airport: "enhancing Istanbul's position at the very top of the global airports league"*. Available at: http://www.airport-business.com/2021/04/istanbul-airport-enhancing-istanbuls-position-top-global-airports-league/ (Accessed 26 July 2022).

"ACCELERATING THE DEVELOPMENT OF THE CARGO ZONE IS ONE OF THE PRIORITIES WITHIN THE NEW STRATEGY OF BRUSSELS AIRPORT. WE WANT TO FURTHER STRENGTHEN OUR POSITION AS A GLOBAL CARGO HUB AND DEVELOP THE CARGO AREA IN A SUSTAINABLE WAY IN ORDER TO OFFER OUR LOGISTICS PARTNERS THE MOST EFFICIENT INFRASTRUCTURE AND OPERATIONAL PROCESSES." [84]

BRUSSELS AIRPORT

COMPETITION FOR CONNECTING PASSENGERS

Competition for connecting passengers is primarily centred at hub airports (such as London Heathrow, Frankfurt, Paris Charles de Gaulle, Istanbul, Munich and Amsterdam Schiphol) secondary hub airports (Madrid, Zurich, Vienna, Rome, Helsinki), and niche and smaller hubs (LIS, WAW, DUB, etc)[85] and often comes as a result of passengers transferring from intra-European flights to a long-haul flight to a destination outside Europe. With the relatively slow (to date) return of long-haul traffic, there is limited evidence on how this type of competition has evolved over the last couple of years. However, given the significant spare capacity at these hub airports, competition for these types of passengers is likely to be intense as/when this market resumes.

COMPETITION FOR PASSENGERS IN THE LOCAL AREA

In our survey, airports also noted a fall in the use of public transport to access the airport. It is unclear what impact this may have on competition between airports in the local area because it may mean that fewer people are able to choose between airports (if they would previously have relied on public transport) or it may mean that passengers who are able to use their cars are able to choose from a wider range of airports.

To provide an example of this, the quote below shows that London City Airport aims to increase its competitiveness for local passengers by focusing on its customer proposition.

"THE NEW FACILITIES FOR IMMIGRATION AND BAGGAGE WILL ALSO ENHANCE OUR INDUSTRY-LEADING PASSENGER PROPOSITION, ENSURING THAT LONDON CITY AIRPORT CONTINUES TO PROVIDE THE QUICKEST AND MOST CONVENIENT AIRPORT EXPERIENCE IN LONDON." [86]

ROBERT SINCLAIR
CHIEF EXECUTIVE, LONDON CITY AIRPORT

COMPETITION FOR CORPORATE CONTROL

There is evidence that despite the pandemic, the market for airport control remained competitive. A recent example is the airport privatisation in Brazil (which is still occurring[87]) which attracted several bidders such as AENA, Corporacion America Airports, and Vinci, even during the pandemic: the 2021 auction raised 3.3 billion reais, a similar amount to what was raised in the 2019 auction[88].

5.3.1 OVERALL PICTURE OF RECENT COMPETITION DEVELOPMENTS

Taking the factors outlined in this section together, they suggest that recent experience by airports (as reported in the survey conducted for this study), further analysis of airline schedules' data and public material is consistent in pointing to an increase in the level of airport competition over the next few years as the aviation industry returns from the Covid-19 pandemic. The table below summarises these factors.

[84]Aviation Business News (2022) Brussels Airport to invest €70 million to further modernise its cargo zone. Available at: https://www.aviationbusinessnews.com/cargo/airlines-airports-cargo/brussels-airport-to-invest-e70-million-to-further-modernise-its-cargo-zone/ (Accessed 26 July 2022).

[85] A full list of hubs is in page 24 of ACI EUROPE 2022 Connectivity Report, available here: https://aci-europe.org/downloads/resources/CONNECTIVITY%20REPORT%202022.pdf (Accessed 26 July 2022).

[86] From ACI EUROPE (2021) *Istanbul Airport: "enhancing Istanbul's position at the very top of the global airports league"*. Available at: http://www.airport-business.com/2021/04/istanbul-airport-enhancing-istanbuls-position-top-global-airports-league/ (Accessed 26 July 2022).

[87] CAPA (2022) *Rio's Santos Dumont Airport's 'go-it-alone' concession dramatically changed to double with Galeão*. Available at : https://centreforaviation.com/analysis/reports/rios-santos-dumont-airports-go-it-alone-concession-dramatically-changed-to-double-with-galeo-595767 (Accessed 26 July 2022).

[88] Reuters (2021) *Brazil raises $600 million in privatization auction of 22 airports*. Available at: https://www.reuters.com/article/us-brazil-airports-privatization-idUSKBN2BU2NK (Accessed 26 July 2022).

TABLE 8 SUMMARY OF RECENT COMPETITION DEVELOPMENTS

AIRPORT COMPETITION MECHANISM	INCREASED/DECREASED COMPETITION?	KEY FACTORS
Airline services	Increased	▪ Greater proportion of leisure passengers ▪ Shorter airline planning horizons ▪ Greater proportion of LCCs ▪ Greater proportion of short-haul flights
Connecting passengers	Unclear	▪ Greater proportion of short-haul flights
Local passengers	Unclear, maybe slight reduction	▪ Reduced use of public transport
Corporate control	No clear change	▪ Continued activity in market of major players

Source: Frontier Economics.

6 KEY TRENDS SHAPING THE FUTURE OF THE AVIATION INDUSTRY

SUMMARY

An analysis of the trends shaping the aviation industry over the next five to ten years suggests that competition between airports is likely to be either sustained or increased because:

- A number of factors look set to constrain the rate of growth in the demand for air travel (the factors include: environmental concerns; increasing costs from decarbonisation; current - although potentially relatively short-term – high inflation reducing disposable incomes; potentially a permanent reduction in business travel due to coronavirus derived changes in working practices; and geo-political uncertainty). Slower growth, all other things being equal, increases the amount of spare capacity (relative to a faster growth scenario) within the airport network and therefore, increases the time in which airports have a strong incentive to compete for airline services and passengers (of all types, including connecting and in their local areas).

- A number of factors in the business models of airports and airlines look likely to increase competition directly, including airline consolidation (which would increase the negotiating power of airlines), increasing point-to-point flights (which reduces the number of connecting passengers and enables more airports to compete for passengers who would previously have had to take connecting flights), less business travel (making the passenger market as a whole more price sensitive) and increased automation and digitalisation (increasing the proportion of fixed costs in an airport's cost base and therefore further increasing the profitability of a marginal passenger).

While airport capacity constraints are likely to return (albeit at a slower rate than previously expected), any dampening effect on airport competition is likely to be mitigated by a number of factors including the scope for technology to enable increased runway throughput, the continued incentive for airports to compete to retain existing services and to improve their passenger mix (as opposed to increasing increase passenger volumes directly) and by the expectation that even in 2050, Eurocontrol expects relatively few airports to be capacity constrained. [89]

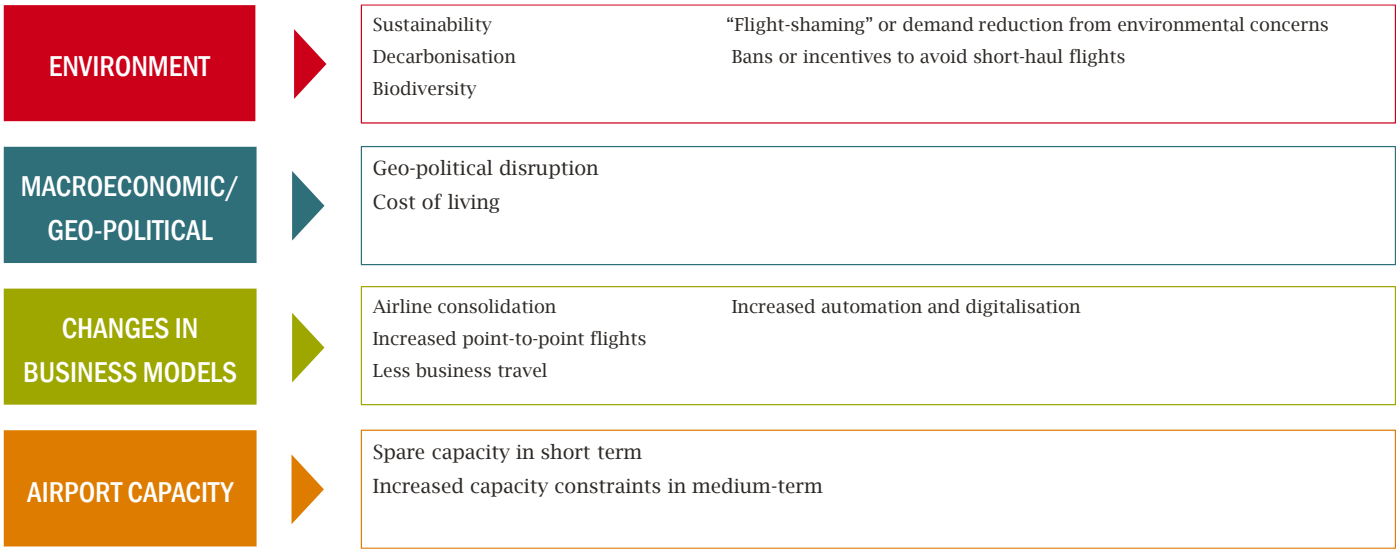
Previous sections of this report have examined indicators of airport competition over the last five years, drawing on a range of sources, to demonstrate the continued prevalence of airport competition. This section builds on that to consider the trends which may shape the aviation industry over the next five to ten years and the implications of those trends for airport competition. Looking into the future is inherently more uncertain than looking at what has happened but is necessary in considering how the competitive environment in which airports operate may change over the next five to ten years.

This section draws on the survey of airports conducted for this study, industry knowledge, a special workshop of ACI EUROPE's members and a range of evidence from third parties.

Based on extensive engagement with the industry, the figure below summarises the key trends affecting the aviation industry over the next five to ten years.

[89] Eurocontrol (2022) *Aviation outlook 2050.* p. 8.

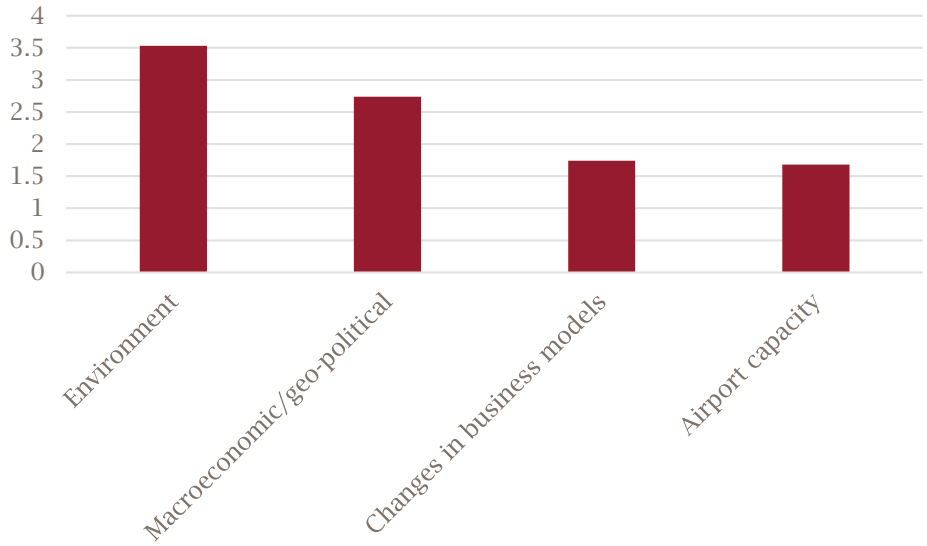
FIGURE 45 FOUR KEY TRENDS SHAPING THE AVIATION INDUSTRY'S FUTURE



Source: Frontier Economics.

The results of a poll of members of ACI EUROPE's airport charges taskforce on the ranking of these trends is below and shows that these airports assessed that environmental issues were likely to be the most important for airports over the next five to ten years, followed by macroeconomic/geo-political issues; with changes in business models and airport capacity issues given approximately equal importance.

FIGURE 46 AIRPORTS RANKED ENVIRONMENTAL ISSUES AS THE MOST IMPORTANT



Source: Frontier Economics analysis of a poll of ACI EUROPE's airport charges taskforce members.

Note: Respondents were asked to rank the trends in order of importance, and these are then averaged. So, a score of 4 would result from all respondents ranking that trend as the most important, and a score of 1 would result in all respondents ranking that trend as the least important. There were 18 respondents.

The remainder of this section considers these trends in more detail.

6.1 ENVIRONMENTAL CONCERNS

Environmental concerns cover a range of topics, including carbon (and other gases contributing to climate change) emissions, biodiversity, local air pollution and noise. In this section, we focus on the reduction of carbon emissions as being the main factor that airports report as being a factor of concern for them and their customers. This does not diminish the impacts of, or efforts being put into, addressing these other environmental topics.

It seems likely that environmental concerns around aviation will affect both the demand for, and costs of supplying,[90] flights. However, if environmental concerns result in airport expansion being more difficult, then this may in the longer run increase the extent to which capacity constraints affect the volumes which can be provided (if airports are capacity constrained, there remains an incentive to compete, but it is less than if there is spare capacity at the airport). The effect of this is explored separately in the section on airport capacity below.

There is growing evidence that consumers are becoming increasingly concerned about the climate impacts of their flights.[91] In addition, to the extent that initiatives to reduce/eliminate carbon emissions add costs to airports, this would be expected to increase the costs to airlines and – ultimately – to passengers, thus reducing (or slowing the growth in) the demand for air travel.

Any such slowing can be expected to increase the level of competition between airports for airline services and passengers as, all other things being equal, lower growth in demand will result in more spare capacity across the airport system and therefore lower profitability. In turn, this lower profitability increases the incentive for airports to compete for airline services and each passenger.

In theory, it may be possible for airports to compete based on their environmental credentials: i.e., environmental credentials could become an aspect of non-price competition. However, this seems relatively unlikely for three main reasons: the first is that some airports have made more progress than others in reducing their carbon emissions and there is little evidence that this affects their competitive position; the second reason is that many airports are working in the same direction and so there may be relatively little difference between airports for passengers or airlines to choose on; the third reason is that there is little evidence that airlines would choose airports based on the environmental credentials of the airport itself, as opposed to, say, the level of landing charges and access to the passenger market that airport facilitates. This is a fast-changing aspect of the aviation industry, and so it is possible that this may change in the future and airports could begin to compete on their environmental credentials, which may well be beneficial for attracting financing[92].

Airports since 2009 have taken an active role in managing their environmental impact through the industry-developed Airport Carbon Accreditation (ACA) programme, through which airports can measure,

[90] There is also the potential that different environmental policies in Europe compared to other parts of the world (particularly the Middle East) result in increased costs of European compared with non-European airports. This could result in a competitive disadvantage for European airports. This would be particularly experienced by European hubs who compete for transfer passengers over a wide geographic area that extends beyond Europe.

[91] McKinsey (2022) *Opportunities for industry leaders as new travelers take to the skies*. Available at: https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/opportunities-for-industry-leaders-as-new-travelers-take-to-the-skies (Accessed 26 July 2022).

[92] European Commission, Directorate-General for Mobility and Transport (2021) *Sustainable finance taxonomy for the aviation sector*. Publications Office. Available at: https://data.europa.eu/doi/10.2832/500890 (Accessed 26 July 2022).

optimise, reduce and eventually off-set residual emissions. An expansion in 2020 saw airports also set accreditation levels based on alignment with the Paris Agreements.[93]

There is evidence that investors are increasingly concerned about the environmental performance of their assets and are exerting pressure on organisations to reduce/eliminate carbon emissions. For example, in 2020 Larry Fink, the CEO of BlackRock wrote that "Climate risk is investment risk"[94] and followed this two years later by noting that "Sustainable investments have now reached $4 trillion"[95] and stated that "every company and every industry will be transformed by the transition to a net zero world"[96]. It is therefore likely that, for airports exposed to changes in corporate control, these capital market pressures result in competition between airports to reduce their carbon emissions. In turn, it is likely that these would affect all airports by creating a benchmark for carbon reduction which could be applied to other airports (of course, the converse is true also that some airports could "set the standard" which is then applied to other airports by those airports' owners).

6.2 MACROECONOMIC AND GEO-POLITICAL UNCERTAINTY

Recent months have been dominated by rising inflation and geo-political uncertainty following the Russian invasion of Ukraine and subsequent airspace closures.[97]

As the figure below shows, inflation across the Eurozone is currently running at levels not seen for many years.

[93] Air Carbon Accreditation (2022). Available at: https://www.airportcarbonaccreditation.org/ (Accessed 26 July 2022).

[94] Black Rock (2020) *A Fundamental Reshaping of Finance*. Available at : https://www.blackrock.com/corporate/investor-relations/2020-larry-fink-ceo-letter (Accessed 26 July 2022).

[95] Black Rock (2020) *A Fundamental Reshaping of Finance*. Available at : https://www.blackrock.com/corporate/investor-relations/2020-larry-fink-ceo-letter (Accessed 26 July 2022).

[96] Black Rock (2020) *A Fundamental Reshaping of Finance*. Available at : https://www.blackrock.com/corporate/investor-relations/2020-larry-fink-ceo-letter (Accessed 26 July 2022).

[97] At the time this report was produced in May 2022, the airspace of the EU and UK was closed to aircraft from Russia; and Russian airspace was closed to aircraft from the EU, UK and a number of other countries. See: European Commission (2022). Available at: https://ec.europa.eu/commission/presscorner/detail/en/statement_22_1441 and UK government (2022). Available at: https://www.legislation.gov.uk/uksi/2022/183/introduction/made (Accessed 26 July 2022).

FIGURE 47 RECENT EUROZONE INFLATION IS AT A RECORD HIGH

Source: Eurostat

Note: Time series of the annual rate of change in the Harmonised Index of Consumer Prices for the 19 Euro area countries. Online code: PRC_HICP_MANR.

As demand for air travel is affected by passengers' available incomes, high inflation is likely to reduce demand for air travel by reducing passengers' disposable incomes. The table below shows forecasts of inflation in the Eurozone and shows that the European Central Bank and European Commission expect inflation to return to historical standards within a couple of years.

TABLE 9 FORECASTERS EXPECT INFLATION TO RETURN TO HISTORICAL TRENDS BY 2024

	DATE OF RELEASE	2022	2023	2024
European Central Bank (ECB)	March 2022	5.1	2.1	1.9
European Commission	February 2022	3.5	1.7	-

Source: European Central Bank: https://www.ecb.europa.eu/pub/projections/html/ecb.projections202203_ecbstaff~44f998dfd7.en.html#toc7

Note: Forecasts for Harmonised Index of Consumer Prices. Original sources referred to by the European Central Bank: European Commission Winter 2022 Economic Forecast (Interim), 10 February 2022.

Therefore, while there may be temporary impacts from the current high inflation, the consensus of forecasts is that this will abate relatively quickly, although there is substantial uncertainty. The level of geo-political uncertainty about the continued recovery from Covid (particularly the impact of the Chinese zero-Covid policy and associated travel restrictions) and outcomes of the conflict in Ukraine on global food and commodity prices are subject to even greater uncertainty.

Given the extent of uncertainty about these ongoing macroeconomic and geo-political uncertainty, it is very hard to predict their implications for airport competition. However, some tentative conclusions can be drawn: to the extent that inflation reduces disposable incomes, this would be expected to reduce passenger demand for air travel and therefore increase the incentives for airports to compete for the passengers who continue to travel. Moreover, increasingly price conscious consumers will likely increase the pressure on

airlines to keep costs low. Airlines will, in turn, increase pressure on airports. To the extent that geo-political uncertainty continues to remain high, this may also act to reduce passenger volumes and thus increase the incentive for airports to compete for the smaller passenger base.

6.3 CHANGES IN BUSINESS MODELS AND MARKET STRUCTURE

There are many potential changes in airport and airline business models which are relevant to the development of the aviation industry over the next five to ten years. Four changes in business models we have identified as potentially being particularly important are:

- **Airline consolidation**: many airlines have experienced substantial losses during the Covid-19 pandemic (for example, EasyJet reported losses of £1.1bn in 2021[98] and Lufthansa reported losses of €2.3 billion in 2021[99]) but some airlines have substantial cash reserves (for example, easyJet reported liquidity of £4.4bn which provided "strength to capture opportunities" and Ryanair reported £3.2bn of cash in its 2021 accounts[100]). This combination of substantial losses and cash reserves for some operators suggests that there may be airline consolidation in the coming years. This could take place through corporate acquisition or through airline competition where stronger entities expand faster than, or at the expense of, the weaker. Airline consolidation would be likely to increase the extent to which airlines can negotiate effectively with airports and therefore increase the competitive constraints on airports in relation to airline services.

- **Increasing use of point-to-point operations** (i.e., flying directly between origins and destinations rather than transiting through a hub)[101]: considering patterns of aircraft orders gives an insight into the types of airline operations which may exist in the coming years, given the lag between an order being placed and an aircraft entering service. Since 2019, Airbus reports that the number of A380s (designed to carry a large number of passengers between hubs) in its pipeline reduced by 66 between 2018 and 2021 and production has been discontinued[102]. In contrast, the pipeline for the smaller A350 increased by 127[103]: this is consistent with trends over the recent past and a continued growth in the extent to which airline services bypass hubs. In turn, this is likely to sustain competition for airline services (as this additional capacity comes into the market) as the range of airports competing for those previously connecting passengers increases.

- **Less business travel**: this is a continuation of an established trend (as set out in section 3). While it is still too early to understand the full implications of the Covid-19 reductions in business travel,

[98] easyJet (2021) Available at : https://corporate.easyjet.com/~/media/Files/E/Easyjet/pdf/investors/results-centre/2021/2021-full-year-results-release.pdf (Accessed 26 July 2022).

[99] Lufthansa Group (2022). Available at: https://investor-relations.lufthansagroup.com/en/news/financial-news/investor-relations-financial-news/date/2022/03/03/lufthansa-group-expects-strong-travel-season-operating-loss-cut-by-more-than-two-thirds-in-2021.html (Accessed 26 July 2022).

[100] Ryanair (2021) *Annual Report*. Available at: https://investor.ryanair.com/wp-content/uploads/2021/08/FINAL_Ryanair-Holdings-plc-Annual-Report-FY21.pdf (Accessed 26 July 2022).

[101] It is also possible that hubs in other parts of the world may extend their connections to secondary European destinations, for example, hubs in North America increasing their spokes into Europe and thus bypassing European hubs.

[102] See BBC News (2021). Available at: https://www.bbc.co.uk/news/business-59667835 (Accessed 26 July 2022).

[103] The Airbus A321neo and A321LR have also seen significant rises in orders. See Simple flying (2021). Available at: https://simpleflying.com/airbus-a321-rise/ (Accessed 26 July 2022).

it seems highly likely that the volume of business travel may have permanently reduced.[104] As explained earlier in the report, a lower proportion of business travel will result in a market with an increased proportion of leisure travel, and which is therefore likely to be more sensitive to price than was the case before the Covid-19 pandemic. In turn, this is likely to drive increased price sensitivity from airlines and result in increased competition between airports based on prices.

- **Increased use of automation and digitalisation in airport operations**: as airports increasingly use technology in airport operations[105], this is likely to result in an increase in the capital costs of airports and a reduction in operating costs. This would increase the proportion of an airport cost base that is relatively fixed, and thus make incremental passengers more profitable, thus reinforcing the incentive for airports to compete more strongly for marginal passengers (of all types, including connecting and in the local area) and airline services.

6.4 AIRPORT CAPACITY

It is clear from the very substantial reductions in passenger volumes during the Covid-19 pandemic (May 2022 has approximately 190,000 flights per day in Europe, compared with approximately 225,000 flights per day in May 2019[106]) that there is currently substantial spare capacity in the airport network. Current operational difficulties at some airports in transitioning from Covid travel restrictions are masking this to an extent but the underlying position will be apparent once these are resolved. Under these circumstances and given the nature of airports with relatively high levels of fixed costs, the period until capacity is used up will be characterised by high levels of competition between airports as those airports seek to fill that capacity given the importance of marginal passengers for profitability (as explained in section 2). How long this situation lasts will depend on how quickly the demand for air travel grows from the current Covid-19 pandemic induced lows.

However, in the longer term, it is likely that airport capacity constraints will become a more important feature of the airport market once again. As airports become capacity constrained, the incentive to compete for all traffic weakens, with airports competing to attract a better quality (i.e., higher yielding) passenger mix and retain existing services rather than competing for all passengers. The extent to which an airport is capacity constrained will vary from airport to airport: the latest evidence from Eurocontrol is that airport capacity constraints are unlikely to be a major challenge for the aviation industry with only 3% of demand being unfulfilled in 2050 in its central case, although some airports are expected to become capacity constrained as demand returns.[107]

While demand forecasts are inevitably uncertain, the current position seems to be that across many countries, and at many airports, there will be sufficient capacity to meet demand and therefore continued competition for airline services, connecting passengers and local passengers. Competition in the market for corporate control is unaffected by capacity constraints at airports.

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[104] See, for example, Forbes (2022). Available at: https://www.forbes.com/sites/suzannerowankelleher/2022/03/12/covid-changed-business-travel/ (Accessed 26 July 2022).

[105] Many of these applications are at an early stage, but could include baggage screening. See, McKay, S. Hartnett, G. and Held, B. (2022) *Airline security through artificial intelligence*. Available at: https://www.rand.org/content/dam/rand/pubs/perspectives/PEA700/PEA731-1/RAND_PEA731-1.pdf (Accessed 26 July 2022).

[106] Eurocontrol (2022) COVID-19 impact on the European air traffic network. Available at: https://www.eurocontrol.int/covid19 (Accessed 26 July 2022).

[107] Eurocontrol (2022) *Aviation outlook 2050*. p. 8.

7 CONCLUSIONS AND RECOMMENDATIONS

This study has compiled evidence on a wide range of indicators of the extent of competition between airports and over a range of time periods. These indicators include analysis of airline schedules, a survey of airports in Europe, consideration of reports to investors, and analysis of public material from airlines and the press.

From 2016 (when the analysis covered in the last report on this topic ended) to the end of 2019 (after which the Covid-19 pandemic badly affected the aviation industry), the indicators of the extent of competition continued to show high and – in some cases – increasing levels of competition between airports for airline services. Competition between the largest airports in Europe for connecting passengers was stable at a high level; and competition for passengers in the local area was also stable at a high level. This is reflected in the observed market outcomes of increasing passenger satisfaction and largely stable real terms aeronautical revenue per passenger.

Evidence from airports' behaviour during the Covid-19 pandemic shows airlines "pulling every lever" to manage their businesses, in a way which was very similar to the efforts undertaken by businesses in other sectors of the economy. They behaved as commercial, competitive businesses might be expected to. As demand returns, there is evidence that several actors and developments in the market are combining to further increase competition between airports for airline services (in particular the growing importance of LCCs, short-haul, leisure passengers; airlines planning at shorter time horizons and route networks changing as services are reintroduced).

Looking ahead, an analysis of the trends which are likely to shape the aviation industry over the next five to ten years suggests that many of the well-established trends observed over the last ten years are likely to continue (in particular, the continued importance of LCCs and leisure travel) thus "locking-in" the observed significant and increasing levels of airport competition. In addition, the key factor that market participants expect to change over the next ten years compared with the last is the impact of environmental concerns: this may constrain the growth in passenger demand and increase costs, leaving fewer airline services and passengers (relative to a scenario in which there were not such concerns) for airports to compete for. They will have to do so more intensively. Working in the opposite direction might be growing airport capacity constraints though these will affect parts of the sector rather than its entirety.

Taken together, the extensive data assembled for this report demonstrates the continued competitive pressures faced by airports. These need to be assessed together because it is the cumulative pressure from all sources that affects airport behaviour. The implication of this evidence for the development of regulatory regimes at airports is clear: in keeping with regulatory best practice, regulation should be considered in the context of the reality of the market situation faced by airports. This report has presented evidence on a wide range of indicators of competition suggesting that there are competitive pressures experienced by airports of all sizes, that they have increased in the wake of the Covid-19 pandemic and are set to increase even further in the coming years. These pressures should be carefully considered by regulators and policymakers to avoid regulation which is unnecessary, overly costly or poorly targeted.

ANNEX A - LIST OF ACI EUROPE MEMBERS AND THEIR COUNTRIES

ACI EUROPE has member airports in 49 countries as of 25 March 2022. All 49 countries are classified by ACI EUROPE are captured as part of the definition of Europe adopted by Frontier in this report.

TABLE 10 COUNTRIES WITH MEMBERS OF ACI EUROPE

COUNTRY	COUNTRY
Albania	Latvia
Armenia	Lithuania
Austria	Luxembourg
Belarus	Malta
Belgium	Moldova
Bosnia and Herzegovina	Monaco
Bulgaria	Montenegro
Croatia	Netherlands
Cyprus	Norway
Czech Republic	Poland
Denmark	Portugal
Estonia	Republic of North Macedonia
Faroe Islands	Romania
Finland	Russia
France	Serbia
Georgia	Slovakia
Germany	Slovenia
Greece	Spain
Guernsey	Sweden
Hungary	Switzerland
Iceland	Turkey
Ireland	Ukraine
Israel	United Kingdom
Italy	**Uzbekistan**
Kosovo	

Source: ACI EUROPE. Available at: https://www.aci-europe.org/downloads/members/2022%2003%2025%20ACI%20EUROPE%20LIST%20OF%20MEMBERS.pdf

*Note: **Bold** indicates countries not in the 2017 Oxera report. Airports in Kosovo are recorded in OAG's data as being in Serbia. Airports in Guernsey are recorded in OAG's data as being in the United Kingdom. Monaco does not have an airport; the only ACI member is a heliport.*

ANNEX B - CASE STUDIES

B.1 - MUNICH INTERNATIONAL AIRPORT

Munich International Airport, also known as the Franz Josef Strauss International Airport, is the second busiest airport in Germany with regards to passenger traffic. With 47.9 million commercial passengers in 2019, it is also the ninth busiest airport in Europe.

Munich International Airport is owned by Flughafen München GmbH, a limited liability company consisting of three shareholders – the State of Bavaria, the Federal Republic of Germany, and the City of Munich.

Located near the town of Freising, Munich International Airport serves as a hub for Lufthansa and its subsidiaries and is the main airport for passengers visiting Bavaria. Munich International Airport has two passenger terminals and two parallel runways, both 4,000 metres in length, with a maximum capacity of 90 aircraft movements per hour.[108]

REVENUES AND COSTS

The table below summarises the financial performance of Munich International Airport across 2019 and 2020.

TABLE 11 MUNICH INTERNATIONAL AIRPORT FINANCIAL PERFORMANCE 2019-2020

METRIC	2019/20	2020/21	% GROWTH
Number of passengers (millions)	47.9	11.1	-77%
Annual Revenues (€m)	1,568[109]	580	-63%
Annual expenditure (€m)	1,057	786	-26%
EBITDA[110] (€m)	554	(162)	-129%
Profit/Loss (€m)	178	(321)	-280%

Source: Munich International Airport Integrated Reports
Note: Figures in brackets represent negative values

THE COVID-19 PANDEMIC

With worldwide travel restrictions as a result of the Covid-19 pandemic, passenger traffic at Munich Airport ground to a near complete halt in the second quarter of 2020. The number of take-offs and landings fell by about 92% by May 2020. Despite a slight recovery over the summer, the situation worsened again in the autumn and winter months. As a result of these restrictions, passenger traffic fell to historic lows, and consequently, Munich Airport suffered large revenue losses.

[108] Munich Airport Integrated Annual Report 2020.

[109] Of which aviation represented 55% (~€862m).

[110] Earnings Before Income Tax, Depreciation and Amortization

To respond to the challenges of the Covid-19 pandemic, Munich International Airport developed a 'coronavirus task force' in February 2020 to assess the ongoing situation and ensure that airport operations could overcome the crisis.

Some of the measures adopted by MIA to manage revenues and costs in response to the Covid-19 pandemic are explored in further detail below.

Managing revenues

- **Solidifying existing brand partnerships:** To safeguard existing partnerships and contracts, particularly with commercial partners, Munich International Airport placed great emphasis on solidifying these relationships to develop a path forward for the post-Covid-19 era.

- **Incentives to airlines:** In 2020, Munich International Airport provided a Covid-19 recovery incentive to airlines in the form of reduced or waived passenger and security charges, to attract airlines to the airport, and bring back a portion of lost revenues.

Managing costs

- **Focusing on critical processes:** Munich International Airport counteracted declining revenues through cost cutting and saving on non-priority capital expenditure, i.e., investments that were not absolutely necessary for operational reasons while still investing where it was cost-efficient to do so, such as finishing investments already started and accelerating investments where this generated savings (such as maintenance of runways).

- **Gearing actions towards increasing liquidity:** To secure liquidity, Munich International Airport took out loans totalling €480m by the end of 2020.

- **Organisational restructuring:** Munich International Airport launched various reorganisation projects to establish leaner management and administrative structures, in a bid to shrink the organisation.

- **Restructured workforce:** To cut personnel costs, short-time work was introduced. Other ad-hoc measures included a hiring freeze. In the coming years, MIA plans to reduce the workforce.

- **Government support schemes:** Munich International Airport also availed of support schemes from the German government, in the form of job retention, or 'furlough' schemes and paid short-term work schemes where employees worked shorter hours and the government contributed to their wages.

- **Temporary closures and divestments:** To further manage liquidity, Munich International Airport temporarily closed down some of its facilities.

B.2 - SWEDAVIA

Swedavia Airports is a Swedish state-owned company that owns, operates, and develops ten of Sweden's busiest airports. Of these airports, the Stockholm Arlanda airport, and the Goteborg Landvetter Airport serve the greatest number of passengers, 25.6 million and 6.6. million passengers respectively in 2019. Across all ten of its Swedish airports, Swedavia served a total of 40.2 million passengers in 2019.

Swedavia was formed in April 2010, when the Swedish Civil Aviation Administration was split up, and all commercial airport operation was transferred to Swedavia.

REVENUES AND COSTS

The table below summarises the financial performance of the Swedavia Airports across the last three calendar years.

TABLE 12 SWEDAVIA FINANCIAL PERFORMANCE 2019-2021

METRIC	2019[111]	2020[112]		2021[113]	
			% GROWTH		% GROWTH
Number of passengers (millions)	40.2	10.3	-74%	11.9	16%
Annual Revenues (€m)	614	304	-50%	300	-1%
Annual expenditure (€m)	421	334	-21%	316	-5%
EBITDA (€m)	179	(17)	-109%	20	
Profit/Loss (€m)	55	(122)	-293%	(116)	5%

Source: Swedavia Annual and Sustainability Reports
Note: Figures in brackets represent negative values

THE COVID-19 PANDEMIC

In March 2020, traffic at Swedavia airports decreased by 98% as a result of the Covid-19 pandemic and ensuing travel restrictions. This fall in passenger numbers greatly reduced revenues for Swedavia's airports and required concerted action to ensure that the organisation could be rebuilt in the aftermath of the pandemic. The next section highlights some of the steps taken by Swedavia to manage its costs and revenues through the pandemic.

Swedavia's airports suffered significant losses in 2020, in response to which they undertook a number of activities to put themselves on a path to recovery in the aftermath of the pandemic.

Some of these measures to manage revenues and costs in response to the Covid-19 pandemic are explored in further detail below.

Managing revenues

- **Scaling back operations:** Swedavia was asked by its owner (the Swedish government) to carry out an assessment of the commercial feasibility of Bromma Stockholm Airport to be taken into account in investigating a potential early closure of the Bromma Stockholm Airport. Following this assessment, Swedavia found that it was no longer commercially justifiable to continue operating the Bromma Stockholm Airport and that traffic in Stockholm could instead be concentrated at

[111] Using a 2019 exchange rate of 10.58 Swedish Krona to EUR. Source: https://www.exchangerates.org.uk/EUR-SEK-spot-exchange-rates-history-2019.html

[112] Using a 2020 exchange rate of 10.49 Swedish Krona to EUR. Source: https://www.exchangerates.org.uk/EUR-SEK-spot-exchange-rates-history-2020.html

[113] Using a 2021 exchange rate of 10.15 Swedish Krona to EUR. Source: https://www.exchangerates.org.uk/EUR-SEK-spot-exchange-rates-history-2021.html

Stockholm Arlanda Airport. Swedavia did however stress that such a decision should be preceded by a broader assessment which accounts for a societal perspective.[114]

- Additionally, operations in the company were scaled down to a minimum based on the market situation, and operations at the bigger airports were concentrated temporarily in certain parts of the airport. For example, all air traffic from Terminals 2 and 4 at Stockholm Arlanda Airport was moved to Terminal 5.

- **Using financial support from shareholders:** In October 2020, the Swedish government gave Swedavia a shareholder contribution worth SEK2.5 billion (~€238m).

- **Relief measures for passengers and partners:** To support customers and other partners, Swedavia offered rent relief measures and discounts. The rationale behind these measures was two-fold:

    - Swedavia wanted to ensure that its partners could survive the crisis and thus still be around in the aftermath of the pandemic; and

    - The management team felt that as Sweden is a small, but highly competitive market (both in terms of aviation and retail markets such as food and beverage retailers), these measures potentially allowed Swedavia to strengthen existing relationships, and ensure that they persist beyond the pandemic i.e. the management teams at Swedavia prioritised relationships with partners during the Covid-19 pandemic to gain a competitive advantage in attracting airlines and other partners when demand returned. With four new airlines setting up a base in Stockholm Arlanda Airport, and several new international routes, Swedavia's support of existing partners helped it attract new partners.

- **Working with local communities:** Over the pandemic, Swedavia adopted a more targeted approach towards regional airports working more closely than ever with their local communities. Swedavia believes that strong ties to local communities are an important factor in ensuring the continued success of airports, particularly, smaller, regional airports.

- **Incentives to airlines:** In 2020, Swedavia airports provided a Covid-19 recovery incentive to airlines in the form of reduced or waived passenger charges, landing charges, and parking charges, to attract airlines to the airports, and bring back a portion of lost revenue.

Managing costs

- **Prioritising business critical issues:** Swedavia froze non business critical tasks and prioritised maintenance measures.

- **Managing cash:** Swedavia paused a number of major capacity-enhancing projects at Stockholm Arlanda Airport.

- **Flexibility and efficiency:** Investment projects that focused on flexibility and utilisation of existing capacity were prioritised

- **Organisational restructuring:** Swedavia developed a plan to adapt the company's operational structure to the new market situation. The aim was to make Swedavia smaller and more efficient than before.

[114] This investigation was launched by the owners, and was not initiated by the commercial teams at Swedavia,

- **Reduced workforce:** To adapt operations, Swedavia Airports announced redundancies for 800 full-time positions.
- **Government support schemes:** Swedavia also availed of support schemes from the government, in the form of job retention, or 'furlough' schemes for ~75% of their workforce where employees worked shorter hours and the government contributed to their wages.

B.3 - KLM ROYAL DUTCH AIRLINES

KLM Royal Dutch Airlines is the flag carrier airline of the Netherlands. KLM was founded in 1919 and is headquartered in Amstelveen, Netherlands. Carrying 35.1 million passengers and 621,000 tonnes of cargo[115], KLM serves 92 European cities and 70 intercontinental destinations. The KLM fleet consists of 109 aircraft featuring Airbus, Boeing, and Embraer models.

In 2004, KLM, in partnership with Air France, established a holding company called Air France–KLM to instal Charles de Gaulle Airport and Schiphol Airport as key international hubs, while maintaining their own separate brands. In 2019, Air-France-KLM represented the 4th largest airline (holding) in Europe, with a combined 104.2 million passengers.[116]

REVENUES AND COSTS

Before the COVID-19 pandemic

The table below summarises the financial performance of the KLM Royal Dutch Airlines across the last three years

TABLE 13 KLM ROYAL DUTCH AIRLINES FINANCIAL PERFORMANCE 2019-2021

METRIC	2019	2020		2021	
			% GROWTH		% GROWTH
Number of passengers (millions)	35.1	11.2	-68%	14.0	25%
Annual Revenues (€m)	11,075	5,120	-54%	6,065	18%
Annual expenditure (€m)	9,132	5,195	-43%	5,370	3%
EBITDA (€m)	1,943	(75)	-104%	695	
Profit/Loss (€m)	449	(1,546)	-444%	(1,258)	19%

Source: KLM Royal Dutch Airlines Annual Reports
Note: Figures in brackets represent negative values

THE COVID-19 PANDEMIC

The global scale of the Covid-19 pandemic meant that the aviation industry across the world was affected. The lockdowns and travel restrictions imposed in the wake of the pandemic meant that passenger numbers declined significantly, and with them revenues.

[115] Annual figures for 2019 (before the Covid-19 pandemic)

[116] Wikipedia (2021). Available at : https://en.wikipedia.org/wiki/List_of_largest_airlines_in_Europe

KLM suffered significant losses in 2020, but was able to survive by cutting costs, managing cash, as well as through support from the Dutch government in the form of a €3.4bn financing package.

Additionally, as a result of the pandemic, KLM's cost base changed significantly. Variable costs such as fuel, aircraft maintenance, and airport fees[117] dropped by ~45%. To achieve structurally lower costs, KLM developed a plan to simplify the organisation structure and manage staff count. Additionally, KLM moved to make its fleet more cost-efficient by phasing out less efficient aircraft types and renegotiating leases.

Some of the measures adopted by KLM to manage revenues and costs in response to the Covid-19 pandemic are explored in further detail below.

Managing revenues

- **Scaling back operations:** In response to the travel restrictions, KLM reduced its schedule to a skeleton network with only a subset of destinations operational. However, KLM sought to maximise the number of destinations, even if at low frequencies, to maintain the global network and capitalise on opportunities
- **Using external financial support:** KLM availed of the opportunity to delay the payment of labour taxes. It also accepted support from the Dutch government in the form of a financing package.

Managing costs

- **Cutting costs:** KLM aimed to reduce immediate costs by postponing less important IT and real estate projects, renegotiating new payment terms with suppliers, and pushing back aircraft investments.
- **Managing cash:** KLM took swift action to retain cash where possible. For example, it chose to offer passengers vouchers as opposed to immediate cash refunds on flight cancellations.
- **Sale of assets:** KLM also sold some assets in the form of Boeing 747 aircraft and engines
- **Managing the fleet:** KLM phased out less fuel-efficient aircraft to reduce costs. It also negotiated lease payment deferrals and discounts
- **Organisational restructuring:** KLM has developed a restructuring plan to make itself smaller, cheaper, and more efficient. In practice, KLM will continue to operate fewer flights and reduce capacity for an extended period of time.
- **Reduced workforce:** Following consultation with trade unions to meet the Dutch government's conditions regarding the reduction of labour conditions, KLM reduced its workforce by 5,000 employees by ending temporary contracts, reducing hired staff, and the launch of voluntary departure plans.

B.4 - SNCF

The SNCF (Société nationale des chemins de fer français) is France's national state-owned railway company. SNCF was founded in 1938 and was a public limited company for 45 years. SNCF later became a state-

[117] These costs account for ~50% of total costs

owned industrial and commercial enterprise. However, in January 2020, SNCF returned to its original structure, with the French state as SNCF's sole shareholder.

SNCF, along with its subsidiaries, operates France's national rail traffic, including the TGV on France's high-speed rail network. One of SNCF's subsidiaries, SNCF Réseau, is responsible for the maintenance of the national rail infrastructure. The operation of domestic rail passenger services is opening to competition, with international passenger and freight operations already open to competition.

Since July 2013, the SNCF headquarters is located in the Parisian suburb of Saint-Denis.

REVENUES AND COSTS

Before the COVID-19 pandemic

In 2019, the SNCF group recorded revenues of €35.1bn, representing a 5.4% increase in its revenues over the previous year. Over the same period, total expenses amounted to €29.6bn, resulting in an EBITDA of €5.6bn. SNCF made a net loss in 2019, amounting to €773m.

During the COVID-19 pandemic

As seen in the case studies above, the Covid-19 pandemic severely affected traffic and revenues in the aviation industry, with airlines and airports considered in this review reporting revenue downturns to the scale of 55-65% from 2019 to 2020. The pandemic and subsequent lockdowns did not only affect air travel but also had an effect on the rail sector.

However, on the basis of SNCF's financial performance over this period, the effect appears to be much less significant compared to the aviation sector. In 2020, the SNCF group recorded revenues totalling €30bn, representing a more modest 15% fall in annual revenues. Over the same period, annual expenses fell to €28.1bn, resulting in an EBITDA of €1.9bn. However, SNCF continued to make a net loss in 2020, amounting to €3.5bn.

In 2021, the SNCF group recorded revenues of €34.8bn, almost recovering to the pre-Covid-19 levels. With annual expenses totalling €30.5bn, the SNCF group recorded an EBITDA of €4.3bn and positive net profits of €767m.

The table below summarises the financial performance of the SNCF group across the last three years.

TABLE 14 SNCF FINANCIAL PERFORMANCE 2019-2021

METRIC	2019	2020	% GROWTH	2021	% GROWTH
Annual Revenues (€m)	35,120	29,975	-15%	34,752	16%
Annual expenditure (€m)	29,613	28,089	-5%	30,536	9%
EBITDA (€m)	5,646	1,936	-66%	4,343	124%
Profit/Loss (€m)	(773)	(3,448)	-346%	767	

Source: SNCF Annual Reports
Note: Figures in brackets represent negative values

THE COVID-19 PANDEMIC

The lockdown and travel restrictions introduced as a result of the Covid-19 pandemic gave rise to a nearly €4bn reduction in SNCF's revenues and to a significant increase in cash flow deficits and debt. Given the diverse activities undertaken by the SNCF group, the pandemic affected different businesses differently – passenger transport and the Voyages activity were hit the hardest, with logistics and freight transport faring better.

However, passenger and freight rail traffic was back to near normal from June 2021. SNCF Réseau reported revenue up 12% from 2020, buoyed by a 19% rise in traffic, which was only 4% below the 2019 level through the pandemic and was on track for a return to the pre-pandemic equilibrium.

Given the scale of the crisis, the SNCF group put in place substantial measures to overcome financial constraints.

Some of the measures adopted by SNCF to manage revenues and costs in response to the Covid-19 pandemic are explored in further detail below.

Managing revenues

- **Diversified business portfolio:** A diversified business portfolio cushioned the impact of the Covid-19 pandemic on the SNCF Group, particularly through the performance of rail freight and e-commerce.
- **Proactive sales policy:** The SNCF Group applied a proactive sales policy to fuel a recovery in passenger travel. In particular, TGV high-speed rail saw a rebound to 80% occupation rates at the end of the first lockdown in France. Part of this was due to low-price tickets offered on parts of the network throughout the summer months. Additionally, new fares introduced in June 2021 fuelled a 32% rebound in passenger rail sales relative to 2020.
- **Dialogue with rating agencies:** The SNCF group maintained transparent dialogue with rating agencies and investors to continue to finance its debt and maintain the confidence of financial markets.

- **Using external financial support:** For the rail sector, the French government put in place a €4.7bn recovery plan to maintain network development and investment capacities. Additionally, there was a further €170 million a year recovery plan specifically for the rail sector.

- **Partial assumption of debt by the State:** In January 2020, the State assumed €25bn of the debt carried by the SNCF.

- **Able to carry out projects essential to future growth:** Despite the effects of the pandemic, the SNCF Group succeeded in carrying out projects essential to future growth in mass transit and rail. In particular, it signed contracts to upgrade services and launch new ones.

Managing costs

- **Cutting costs:** The SNCF Group reduced structural and operating costs, and postponed or cancelled some non-critical projects and investments

- **Managing cash:** To absorb some of the losses, the SNCF Group set up an extensive savings plan.to boost cash availability by reducing external expenses and investments.

- **Sale of assets:** The SNCF Group sold Ermewa Holding SAS[118] and its subsidiaries, whose operations were deemed non-strategic for the Group.

- **Using government support schemes:** From mid-March 2020, SNCF made use of the French government's furlough scheme to reduce its labour costs.

B.5 - HILTON WORLDWIDE HOLDINGS

Hilton Worldwide Holdings Inc. is an American multinational holdings company that manages and franchises a portfolio of hotels and resorts around the world. Hilton is headquartered in Virginia, US. As of June 2020, its portfolio includes 6,215 properties across 118 countries and territories.

In 2013, Hilton became a public company and as of 2018, the company is a fully independent publicly traded company.

REVENUES AND COSTS

The table below summarises the financial performance of Hilton Worldwide Holdings across the last three years.

[118] Ermewa is a subsidiary that specialises in leasing railcars and tankers

TABLE 15 HILTON FINANCIAL PERFORMANCE 2019-2021

METRIC	2019[119]	2020[120]	% GROWTH	2021[121]	% GROWTH
Annual Revenues (€m)	8,680	3,771	-57%	4,905	30%
Annual expenditure (€m)	6,914	3,847	-44%	3,884	1%
EBITDA (€m)	1,839	(76)	-104%	1,015	
Profit/Loss (€m)	814	(630)	-177%	345	

Source: Hilton Annual Reports
Note: Figures in brackets represent negative values

THE COVID-19 PANDEMIC

The reduction in travel due to the Covid-19 pandemic resulted in either complete or partial suspension of hotel operations in many of Hilton's territories. As of February 2021, 97% of Hilton's global hotel properties were open, while approximately 220 hotels had temporarily suspended operations. As a result, the group faced significant revenue downturns and made a net loss in 2020.

However, in 2021 as global travel recovered substantially, Hilton was able to make positive net profits again.

Given the scale of the crisis, Hilton Worldwide Holdings put in place substantial measures to overcome financial constraints. Some of the measures adopted to manage revenues and costs in response to the Covid-19 pandemic are explored in further detail below.

Managing revenues

- **Focused on business growth:** Despite the effects of the pandemic, Hilton was focused on the growth of its business. It continued to open new hotels and expand the development pipeline in 2020. In 2020, the Hilton group opened over 410 hotels

Managing costs

- **Securing liquidity:** Due to the uncertainties of the pandemic, Hilton took proactive measures to secure its liquidity position, including, drawing on credit, suspending dividend payments, and implementing strict cost management measures.

- **Cutting costs:** Hilton temporarily halted certain marketing programmes, eliminated non-essential expenses, including capital expenditures.

[119] Using a 2019 exchange rate of 1.09 USD to EUR. Source: https://www.exchangerates.org.uk/EUR-USD-spot-exchange-rates-history-2019.html

[120] Using a 2020 exchange rate of 1.14 USD to EUR. Source: https://www.exchangerates.org.uk/EUR-USD-spot-exchange-rates-history-2020.html

[121] Using a 2021 exchange rate of 1.18 USD to EUR. Source: https://www.exchangerates.org.uk/EUR-USD-spot-exchange-rates-history-2021.html

- **Sale of assets:** In 2020, Hilton Worldwide Holdings sold Hilton Honors points to American Express for $1bn.

Reduced workforce and organisational restructuring: During 2020, in response to the Covid-19 pandemic, Hilton decided to temporarily furlough 60 percent of corporate employees, enacted temporary salary reductions for employees and executive committee members, and implemented organisational changes to reduce global corporate headcount.