COMING DOWN TO EARTH

AIRPORT OWNERSHIP AND PRODUCTIVITY

Two consistent economic policy trends of the past 40 years – the liberalisation of markets and the privatisation of state-owned enterprise – have had a big impact on the transport sectors of the major economies, and the change has long been evident in aviation. But as, in recent years, these trends reached beyond airlines to the terrestrial infrastructure that enables them to do business, policy-makers have faced some important issues about the efficiency of different ownership models, and the capacity of each to support growth in air travel. The evolution of airport policy therefore illustrates one of the most important themes in the book: the extent to which the transfer of activity from the public to the private sector, over the past 20 years, has improved performance. Or do other factors – most importantly, competition and/or regulation – have a greater impact on economic efficiency?

The history of civilian aviation began in most countries with the development of "national flag-carriers": airlines operating commercially, but promoted – and frequently owned – by national governments. Some governments still, of course, depend on this model today, at least in so far as international trade agreements permit. But liberalisation and competition began in major airline markets as far back as the 1970s, and private sector ownership has become the norm during the past 20 years. The evolution of airport policy, however, is more of a mixed story.

AMERICA FIRST?

Private commercial airlines sprang up early in the United States, stimulated as long ago as 1925 by legislation enabling the US Postal Service to contract with them for carriage of mail. Deregulation of air travel also began much earlier in the United States than in the European Union, although it was stimulated in part by the offer of low-cost transatlantic trips by an entrepreneur from the UK.

A key date in the US was 1978, when the distinction between the domestic carriers (United, Delta, etc.) and the international carriers, Pan Am and TWA, was abolished. This allowed the domestic carriers to establish effective hub-and-spoke networks that fed international services as well as the domestic market, ultimately eating up the rivals that had been global icons in the 1960s: the first, heady days of mass air travel.

The European single aviation market arrived much later: it was built on three EU liberalisation "packages" dating from 1987, 1990 and 1992. These removed government interference in air fares and route selections, and allowed any EU-owned carrier to fly passengers between any two points in the EU.

On the eve of liberalisation, the EU flag-carriers (notably BA, Air France, KLM and Lufthansa) were state owned, with their operations focused on their own national markets. BA was sold in 1987, but it would be another decade before the others would be fully privatised. Meanwhile, following liberalisation there was a big increase in the late 1990s in the number of flights and routes served – driven to a large extent by the re-organisation of flag-carrier operations on an American-style hub-and-spoke model.

The second phase of market development in Europe has coincided with the history of Frontier. Passenger numbers have doubled and the period has been marked by the massive growth of low-cost carriers such as Ryanair, easyJet and more recently WOW air and Norwegian. This has been facilitated by the development of internet booking, bypassing traditional travel agents and transforming the process of selling air tickets. (Given travellers' reliance on the internet today, it is hard now to remember that easyJet did not open its first website until just before Frontier was born, in 1998.)

US AVIATION LIBERALISATION **1978**

RYANAIR FOUNDED **1984**

PRIVATISATION OF BAA **1986**

PRIVATISATION OF BA **1987**

EU LIBERALISATION PACKAGES **1987, 1990, 1992**

EASYJET FOUNDED **1995**

2004 MERGER OF AIR FRANCE AND KLM

2008 PART-PRIVATISATION OF SCHIPHOL AIRPORT, AMSTERDAM

2010 MERGER OF BA AND IBERIA TO FORM IAG

2015 PART-PRIVATISATION OF AENA, SPANISH AIRPORTS

2017 UK GOVERNMENT ANNOUNCES SUPPORT FOR THIRD RUNWAY AT HEATHROW

2019 FULL PRIVATISATION OF PARIS AIRPORTS SCHEDULED

Liberalisation of extra-EU travel took a little longer to follow, but the most significant step occurred in 2007, with the signing of the US-EU Open Skies Agreement. This extended the rights of US and EU-owned airlines to carry traffic between points in each other's jurisdictions, and to pick up connecting passengers in those countries for onward carriage to their final destination.

During the Brexit negotiations, the access of the UK to these rights has been called into question, but it would seem that airline liberalisation is sufficiently well embedded for there to be no political appetite for significantly reducing any of these rights for the newly "independent" UK. However, as with so much to do with Brexit, the devil is in the detail: complications have arisen from the complex ownership rules still embedded in these agreements.

HARDER LANDINGS

Growth in air travel on the scale described above could, of course, only be achieved with the parallel development of airports able to facilitate all this movement. One of the key features of the development of low-cost air travel has been the increased use of secondary airports, which is illustrated by the enormous growth in the routes between distinct airport-pairs. However, fare-cutting by the network carriers has driven up demand at the primary airports as well.

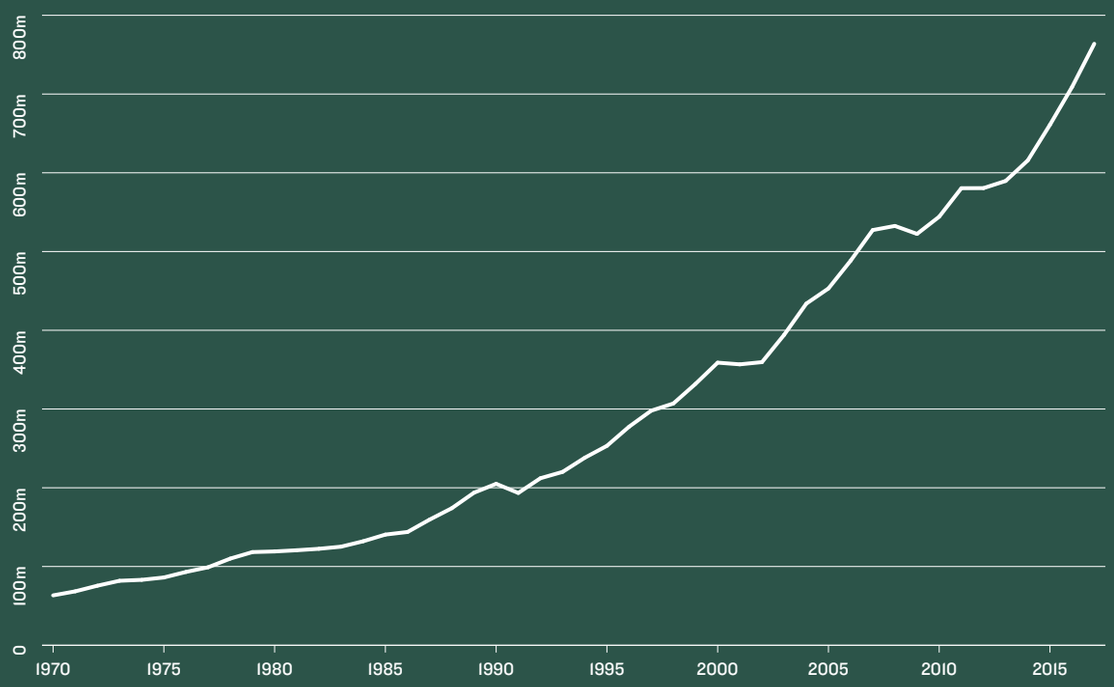
Before 1987, virtually all European airports were publicly owned. So, for that matter, was virtually all land transport infrastructure, such as roads and rail networks. Again like road and rail, airports have found it challenging to accommodate travel growth: modernisation and expansion are costly.

But what distinguishes airports from other transport infrastructure is that at least the largest of them – those accommodating more than, say, ten million passengers a year – can pay their own way. That is, their infrastructure can be more than covered by user charges.

As a result, national governments struggling to finance transport infrastructure have increasingly looked to private sources of finance for the development of their major airports. The prospect of a substantial and reasonably certain flow of income has made airports an attractive target for partial or full privatisation, from both the public and private sector's point of view.

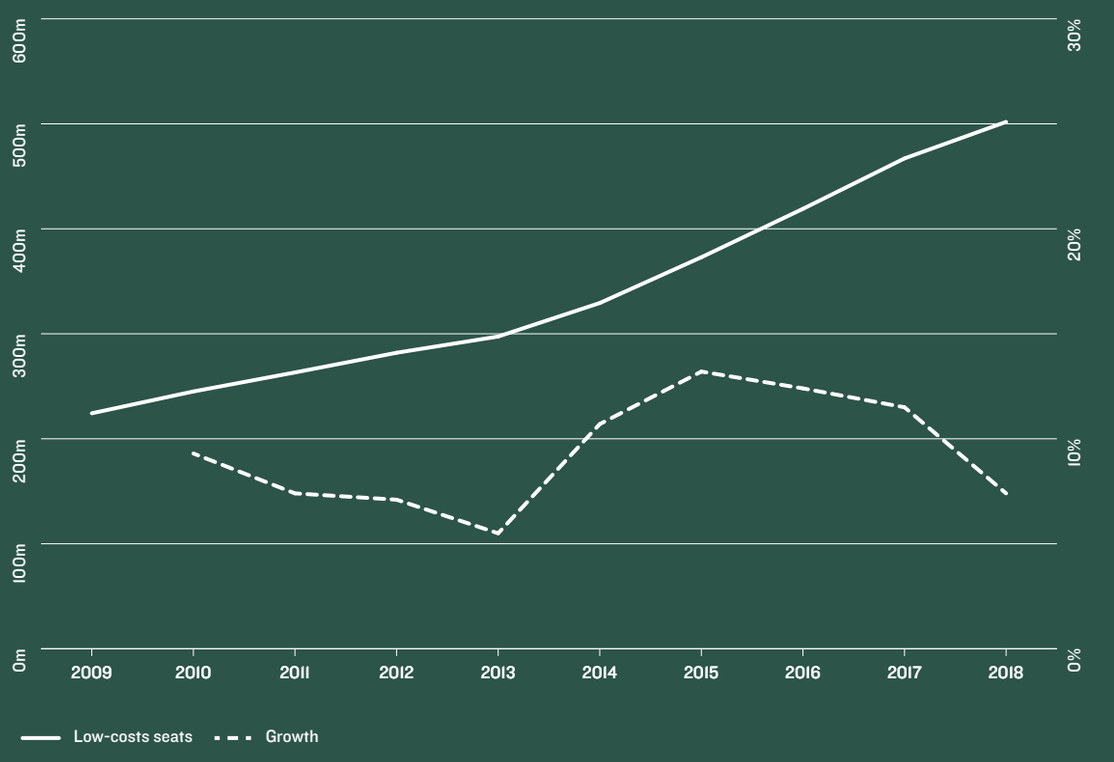
Intriguingly, however, while the US led the way in airline deregulation, it has lagged behind Europe in airport privatisation: the vast majority of American airports remain publicly owned. For instance, JFK, Newark and LaGuardia Airports all remain under the ownership and control of the Port Authority of New York & New Jersey, a public benefit corporation established by the two states in 1921.

FIGURE 3.1: LONG-TERM GROWTH IN EU AIR PASSENGER TRAVEL



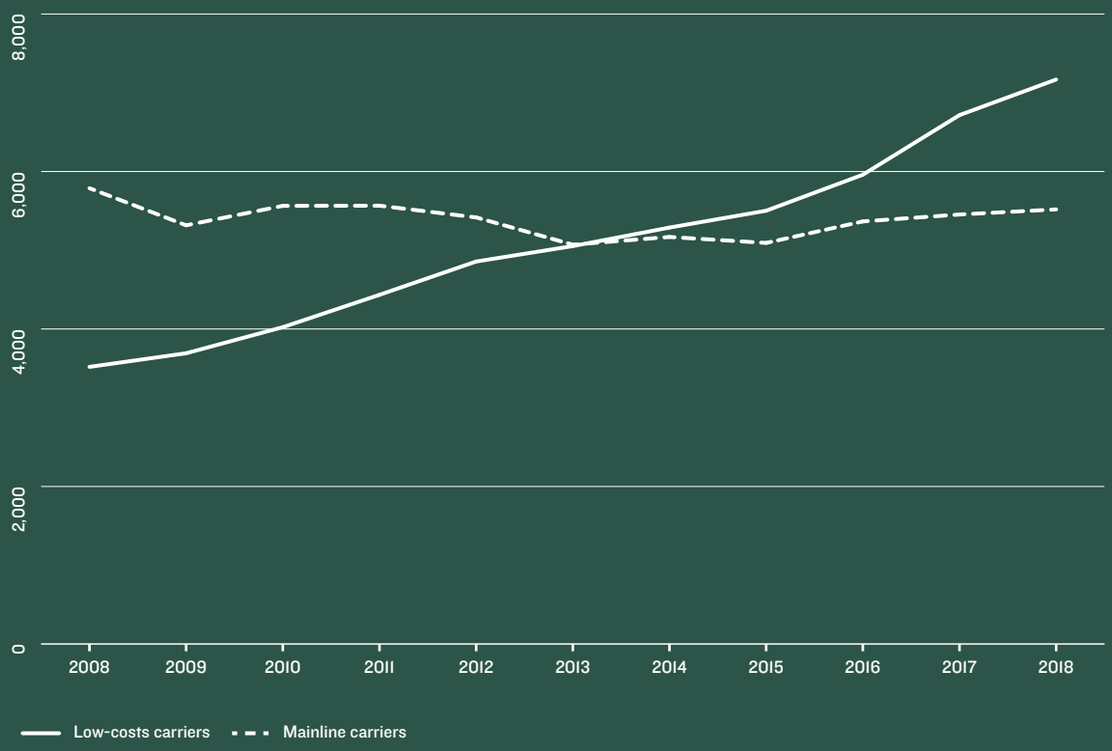
Source: Eurostat.

FIGURE 3.2: EUROPEAN LOW-COST (ANNUAL SEATS (M) AND ANNUAL GROWTH)



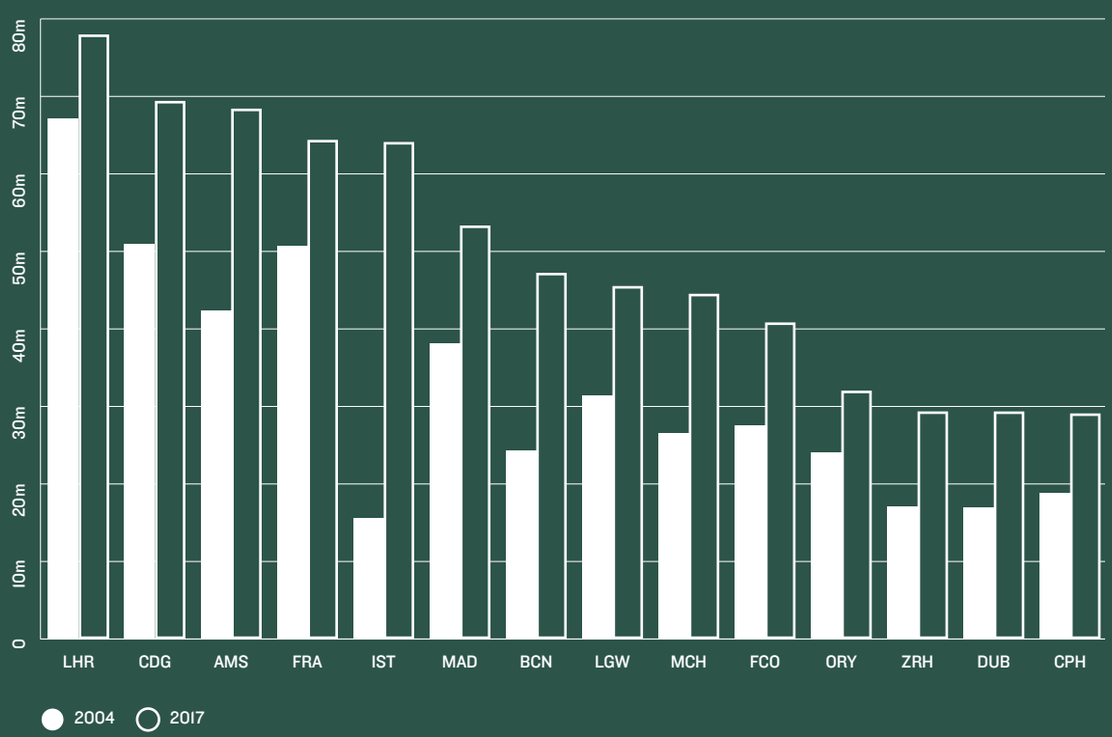
Source: OAG Analyser.

FIGURE 3.3: GROWTH IN EUROPEAN AIRPORTS SERVED



Source: OAG Dagam, Frontier calculation.

FIGURE 3.4: GROWTH IN PASSENGERS AT MAJOR EUROPEAN AIRPORTS



Source: Eurostat.

Background

By contrast, airport privatisation in Europe began well before Frontier was formed in 1999, although to begin with the shift out of public hands took place almost entirely in the UK. The past 20 years have, however, seen a rapid spread of private ownership and control in many other European countries.

The sale of the British Airports Authority, which was floated on the London Stock Exchange in 1986 as BAA plc, was the first major airport privatisation in Europe. BAA operated the three largest London airports: Heathrow, Gatwick and Stansted; Southampton Airport; and four airports in Scotland: Edinburgh, Glasgow, Prestwick and Aberdeen. This was the UK Government's second major privatisation, after British Telecom, and preceded the sale of the water and electricity industries in 1989.

Part-privatisation was more common in continental Europe. Some early examples included Vienna Airport, beginning in 1992 and Copenhagen, beginning in 1994. Aeroporti di Roma, which operates both major Rome airports, was part-privatised in 1997, and (almost) completely so in 2000.

Since 1999, however, European airport privatisation has accelerated. There have been partial sales of – among others – Zurich and Hamburg (2000); Frankfurt and Athens (2001); Brussels and Budapest (2005); and Aéroports de Paris, which operates the two major Paris airports, in 2006.

More recently, AENA, the operator of all major Spanish airports, was part-privatised as a group (in 2011), and ANA, the Portuguese equivalent, was fully privatised in 2013. In 2017, Greece responded to its financial crisis by selling its regional airport network, although Athens Airport remained in public control.

However, until quite recently complete transfers to the private sector were still rare, and primarily restricted to the UK. Germany has been notably reluctant to privatise, and most of its airports remain in public ownership.

After the initial part-privatisation of Aéroports de Paris, France too was slow to ride the privatisation wave, although there has been significant movement there recently. Lyon, Nice and Toulouse Airports were privatised in 2017, and 2019 may see the sell-off of the remaining public stake in Aéroports de Paris.

In the northern part of the European Union, only Ireland and Sweden have resisted the move towards private involvement in airports, although public ownership remains the norm in most of the eastern member countries.

FIGURE 3.5: EUROPEAN AIRPORT PRIVATISATIONS

Airport	Country	% private ownership	Date of first sale to private investors
London Heathrow (LHR)	UK	100	1987
London Gatwick (LGW)	UK	100	1987
London Stansted (STN)	UK	100	1987
Edinburgh (EDI)	UK	100	1987
Glasgow (GLA)	UK	100	1987
Aberdeen (ABZ)	UK	100	1987
Venice (VCE)	Italy	71	1987
Liverpool (LPL)	UK	76	1990
Glasgow Prestwick (PIK)	UK	100	1992
Vienna (VIE)	Austria	60	1992
Copenhagen (CPH)	Denmark	60.8	1994
Belfast (BFS)	UK	100	1994
London City (LCY)	UK	100	1995
Birmingham (BHX)	UK	51	1997
Bristol (BRS)	UK	100	1997
Naples (NAP)	Italy	70	1997
Frankfurt-Hahn (HHN)	Germany	65	1997
Rome Fiumicino (FCO)	Italy	95.75	1997
Rome Ciampino (CIA)	Italy	95.75	1997
London Luton (LTN)	UK	100	1998
Düsseldorf (DUS)	Germany	50	1998
Hannover (HAJ)	Germany	30	1998
Zurich (ZRH)	Switzerland	42	2000
Hamburg (HAM)	Germany	49	2000
Turin (TRN)	Italy	44.29	2000
Frankfurt (FRA)	Germany	29	2001
Athens (ATH)	Greece	45	2001
Newcastle (NCL)	UK	49	2001
Malta (MLA)	Malta	80	2002
Brussels (BRU)	Belgium	62.1	2005
Budapest (BUD)	Hungary	75	2005
Larnaca (LCA)	Cyprus	100	2005
Pisa (PSA)	Italy	78	2005
Paris-Charles de Gaulle (CDG)	France	32.5	2006
Paris-Orly (ORY)	France	32.5	2006
Bologna (BLQ)	Italy	13.9	2007
Leeds Bradford (LBA)	UK	100	2007
Brussels South Charleroi (CRL)	Belgium	22	2008
Schiphol (AMS)	Netherlands	8	2008*
Nantes (NTE)	France	85	2010**
Milan Linate (LIN)	Italy	44	2011
Milan Malpensa (MXP)	Italy	44	2011
ANA (Group, 9 airports)	Portugal	100	2013
Toulouse (TLS)	France	49.99	2014
AENA (Group, 46 airports)	Spain	49	2015
Nice (NCE)	France	60	2016
Lyon (LYS)	France	60	2016

* AMS and Aéroports de Paris exchanged 8% holding.
** Concession cancelled 2018.

Source: Bel, G., Fageda, X., (2010). "Privatization, regulation and airport pricing: an empirical analysis for Europe", Journal of Regulatory Economics 37 (2), 142–161, updated by Frontier.

MIXED MODELS

According to the Airports Council International's survey of ownership in 2016, by that year 16% (by number) of Europe's airports were fully private and 25% had some private involvement. But private involvement is very much skewed towards the larger end of the size distribution, so that this 41% of airports accounted for roughly three-quarters of all passenger movements.

However, privatisation is not the only model for reform being pursued by national governments. Where they have not been sold, in whole or in part, it has still become common for airports across Europe to be "corporatised", that is to say placed on a standalone footing (at least in theory) within the public sector, to be run as commercial enterprises.

Examples include the major Austrian airports (other than Vienna, whose early part-privatisation was referred to above), daa – which is the operator of Dublin Airport – and most of the airports in Croatia, the Czech Republic, Finland, Sweden, Poland, Romania and Lithuania. The same is true of some major French airports (including Marseille and Bordeaux), and many of the larger German airports (including Munich and Cologne/Bonn). It is also the case for both of those airports currently operating for passengers to and from Berlin, where airport arrangements are a saga in themselves.

And finally, yet one more wrinkle emerges in the convoluted story of airport ownership. In some cases, such as the UK airports, the operator owns the airport and the land it stands on, and the right to operate in perpetuity. But in mainland Europe concession arrangements are common. Under such arrangements, a private airport operator may not own the land the airport stands on, only the right to operate that airport for a specified length of time. These concessions come with contractual rules limiting aeronautical charges, requirements to develop and maintain the fabric of the airport, and rules for the transfer of ownership of assets at the end of the concession. While many concessions are for very long periods – more than half are for over 20 years, to encourage investment – ACI's figures showed that in 2016 only 7% of the airports with some private involvement allowed the private operator full ownership of the airport.

The distinction between a concession and outright ownership is an important factor in interpreting comparative data between airports, because of the differing incentives airports may have in choosing between operating and capital-intensive responses to capacity issues.

The fundamental argument for the privatisation of state enterprises has always rested on the belief that the dependence on private capital, in competitive markets, would stimulate greater efficiency in the delivery of goods and services. Airports have proved to be an interesting test of this faith, helping policy-makers to understand the assumptions lying behind it, and the circumstances required to make them good.

There is sufficient diversity in the models used by governments for the provision of airport infrastructure to enable us to draw conclusions of wider significance, at least as far as infrastructure industries are concerned. To reach such conclusions, we can draw on two sources of information: analysis by regulators, and a growing body of research into airports' performance. But regulators are normally focused on the issue of whether a particular airport is as efficient as it could be, given its operating environment. It falls to research to address the wider issues, on the basis of comparative data: what impact do ownership, competition and regulation have on airport efficiency?

TESTING BOTH ENGINES

In the rest of this chapter we draw on this research to try to answer two interlinked questions. First, is there evidence of superior operating efficiency in privately owned airports? And second, do private airports plan and develop capacity more effectively than their publicly owned comparators do? The two questions are linked, because if capacity is not well planned and efficiently delivered, operational efficiency will inevitably suffer. It helps, however, to take each of these in turn.

In many ways, the analysis necessary to address these questions is similar to benchmarking analyses performed on the utility networks, and discussed elsewhere in this book. However, in the case of airports there are a variety of complications which make the process even harder.

Many, if not most, airport privatisations have in fact involved a partial rather than complete transfer to private ownership. Local and/or national governments have retained anything from a small minority to a large majority stake, and imposed more or less rigid conditions on the new owners. Variations in the extent of privatisation complicate analysis, adding the questions "How?" and "How much?" to the fact of privatisation, and these may be more important factors in determining efficiency than the fact of private involvement itself.

But airports also have some characteristics which make them significantly different from other regulated industries, and make benchmarking particularly hard:

- Despite having marginal costs which are below average costs in many circumstances, airports are not clearly, or always, natural monopolies. In densely populated urban areas, competition between airports is possible. Even where there is no direct competition, airports frequently find themselves in competition with other modes of transport. This is particularly true in densely populated Europe.
- Expansion options tend to come in large, indivisible tranches, to a greater extent than in most other regulated utilities. Consider an airport with a single runway, taking 220,000 air traffic movements (ATMs) per annum. It is getting close to maximum runway capacity. Its only real expansion option is a new runway, doubling its ATM capacity: you can't build 10% more runway to take 10% more traffic. The fact that traffic tends to be very seasonal, or to vary by time of day, exacerbates this problem: you cannot build a summer runway.
- Airports produce multiple, distinct outputs. They sell aeronautical services to airline customers, for landing and take-off, plus terminal services that allow the airlines' passenger customers to access the aircraft. But they also sell commercial services to passengers (and airlines). The shops in the terminals provide revenue to the airport, usually through rents paid for retail space by outside operators, although some airports do operate some of their retail space themselves, particularly duty-free. Similarly, car parking is an important source of revenue for many airports, but competes with other methods of surface access which may or may not be under the control of the airport. This complicates both the economics of airports and the assessment of their productivity.

To add to the complexity, there is very considerable difference in practice between airports as to whether they employ staff directly to perform many functions, including cleaning and maintenance, or whether they contract out these services to third-party suppliers. Differences in these practices between airports, and in how airports report them, make the process of benchmarking airports against each other very difficult indeed, particularly when attempting to make comparisons between airports in different jurisdictions.

This problem is orders of magnitude more difficult than that faced by sector regulators in, say, the energy and water sectors. These usually face the task of making comparisons between a significant number of companies which are all within the one "home" national jurisdiction, narrowing the differences in business practices and reporting rules. To arrive at a sufficient number of units to permit serious airport benchmarking requires cross-border comparisons. And to add to the difficulty, such comparisons require corrections for currency variations, differences in local wage rates and business and employment taxes.

All these problems affect the use of cost data to make performance comparisons. But as if that were not enough, there are serious problems in making comparisons on the output side too. Assessing airport productivity is complicated by the need to adjust for differences in what passengers and airlines get for their money: i.e. the differences in the services provided, and their quality.

Airport service quality also has many dimensions. Among the most basic, for example, are:

- the cleanliness of terminals
- the availability of adequate seating in waiting areas
- the provision of appropriate signage, enabling passengers to find their way easily to flights or other facilities, including delivery of information to passengers' own smart devices
- the walking distances between facilities, and the provision of moving walkways (in operation!) if these are long.

The need to adjust for quality variations is a familiar issue in the benchmarking of performance by service providers, and so in the regulation of utilities. But in the analysis of airports the range and number of variations, and the difficult issue of assessing the value users place on various different metrics of service quality, make comparison extremely difficult.

WHAT'S IT ALL FOR?

As if the complexities of service benchmarking were not enough, there is a more fundamental issue to be taken into account. The very purpose of airports is not as straightforward as you might think.

Over and above their role in the supply chain of air services, airports may be required to play a key role in regional economic development plans. International connectivity may be seen as a key contributor to the commercial development of a city or region, while becoming a destination supported by a major low-cost carrier airport could give a huge boost to local tourism.

For this reason airports have often been operated with broader objectives than those normally pursued by standalone enterprises. If they are seen as key drivers of economic development, airports may make (or be forced to make) decisions on development that might not always be in line with their narrow financial interests.

Consider, for example, the development of T2 at Dublin Airport. Construction began in 2007 and the terminal opened in 2010. With the benefit of hindsight the timing was far from perfect, straddling the global financial crisis, but ordinary commercial businesses made that mistake too. Pressures to do so were, however, increased by political desires for Dublin Airport, a publicly owned corporation, to make a national statement, developing a new terminal as a gateway through which Ireland would be shown off to the world. In a final twist to this story, however, the huge boom in air travel in and out of Dublin since 2014 has made the terminal financially viable after all.

Dublin Airport, however, is not the only example of what might at best be called a national economic investment, and at worst a political vanity project. The massive expansion of Barajas Airport in Madrid in the mid-2000s falls in the same debatable "statement" category. By 2017 traffic there was barely any higher than it had been in 2007.

Inevitably, the day-to-day costs of running an airport are strongly influenced not only by its throughput (passengers or aircraft movement) but also by the size and complexity of its infrastructure. So an airport that finds itself hosting infrastructure that is over-large for its throughput (if perhaps only in the short to medium term) may also find itself with higher running costs than its comparators. This adds further to the benchmarking problem.

Airports may also face the opposite problem of being unable to expand to an efficient level, if social and environmental issues prevent them doing so. Runways and associated terminals are not easily or quickly approved through normal planning processes.

Capacity, in short, is under both political pressure to expand, and political constraint not to do so. If we compare an airport with a standard privately run commercial business, whose aim is to optimise both its operations (i.e. to be as efficient as possible in the short run) and its capacity (i.e. to be dynamically efficient to meet current and future demands), the differences are stark. Realistically, there is no way in which we can expect airport planning and capacity to be determined by a free-functioning market that seeks out the optimum solution to the capacity problem in a Hayekian process of discovery.

BOX 1

HOLDING PATTERNS

There could hardly be a clearer example of the political constraints on airport capacity than the UK's struggles over the past 20 years to determine whether London should get a new runway and, if so, at which of its major airports it should be built. Before losing the general election in 2010, the Labour government officially supported a third runway at Heathrow, the biggest of London's airports and its only hub.

The incoming government, a coalition of Conservatives and Liberal Democrats, shelved the question in 2010, both parties having committed themselves against another Heathrow runway in response to the local environmental lobby. Time was bought for further delay by the impact on air travel of the global financial crisis, but the issue would not go away.

As economic activity began to pick up, the impossibility of the government's position became increasingly clear. Heathrow was already at capacity in terms of permitted aircraft movements, and Gatwick, London's second biggest airport, was approaching a similar state.

Nevertheless, it took the expert commission – appointed in 2012 – three years to come to a decision. And, despite the unanimous support of these experts for a new runway at Heathrow, the government took the best part of another two years to ratify this decision. Even then, the planning process around the runway, to take account of all valid local planning concerns, means that a further three years must elapse from the time of this decision before ground can be broken for the construction. Watch this space... ■

Airports, especially big ones in urban areas, are inevitably subject to major constraints on how they are designed and how they operate. Every airport is, to a greater or lesser extent, a special case. This clearly complicates the question of assessing whether private ownership and control of airports help or hinder the optimal planning and development of capacity, over and above issues relating to the availability of private financing.

Despite the difficulties, there is a growing literature on the benchmarking of airports focused on examining the following factors:

- The merits of different forms of regulation, including comparisons of single, hybrid or dual-till formulations which treat profits from non-aeronautical activities such as shops and car parks in different ways.
- The effect of different degrees of competition.
- The impact of different ownership structures.

IRREGULAR REGULATORS

Airports are subject to very different structures of sector-specific regulation – often, it has to be said, without very much attention being paid to whether such regulation is justified in the first place.

A diversity of regulatory approach is true even within national jurisdictions, let alone across borders. For instance, in the UK only one airport, Heathrow, is subject to full price-cap regulation; while only one other, Gatwick, is subject to a (lighter) monitoring regime, based on the airport's commitments to maintain real price changes below an agreed level.

Every single other airport in the UK, including Manchester and Stansted (which both figure in the list of the 20 largest airports in the EU-28) is entirely free from economic regulation – except, of course, for competition law.

Similarly, all the airports in Australia are "price monitored" by the national competition authority, but not directly regulated. The presumption is that either the airport does not have significant market power, or that if it does, the application of competition law is sufficient to protect consumers. In continental Europe, however, some form of direct economic regulation is much more common.

Many different forms of regulation are applied. In "An economic assessment of airport incentive regulation", published in *Transport Policy* in 2015, Nicole Adler, Peter Forsyth, Jürgen Müller and Hans-Martin Niemeier usefully categorise them as follows:

1. **"Pure" price caps,** whereby a regulated firm's prices are set by reference to an external yardstick, not to the firm's actual costs. This is in keeping with the original conception of RPI-X regulation, which dates back to various pieces of academic work by Professors Littlechild, Shleifer and Stern, starting in the 1980s.
2. **"Hybrid" price caps**, whereby maximum prices are determined every few years, by reference at least in part to a regulated company's actual operating costs and capital base.

3. **Total revenue or revenue/ profit-sharing arrangements**, whereby a regulated company shares its profits with its customers according to some pre-set formula, once they exceed some given target.
4. **Simple cost-based regulation**, whereby prices are set as the sum of actual declared costs, without necessarily making reference to any external benchmarks or comparators, and may be reset on an annual basis.

A mixture of these four approaches may be applied in practice. However, pure price caps – using the yardstick approach – are rare.

Limited benchmarking exercises using this approach have been employed by regulators, to help reduce the information asymmetry that might otherwise exist between the airport and its regulator. But the difficulties in making accurate comparisons between airports, fully adjusting for differences in their operating environment, means that no airport is formally regulated on this basis.

Historically most publicly owned airports had their charges set on the fourth option – a cost-plus basis, often calculated annually. The use of hybrid price caps – the second option – was not seen until 1986 when an RPI-X approach was applied to the privatised BAA, in imitation of the system adopted in the UK a few years before for the regulation of British Telecom.

Hybrid price caps resembling this have been introduced at a number of European airports. But these are often accompanied by "sliding scale" elements that reduce the incentive power of the regime: for instance, sharing mechanisms that allow airport charges to be increased if traffic growth is lower than anticipated.

The third option – for revenue-sharing arrangements – has been particularly popular with the German and Austrian authorities for airports there. In some cases (Vienna and Hamburg) this mechanism has had the effect of virtually guaranteeing the airport a certain level of income. In other jurisdictions, common charges are adopted across more than one airport regardless of the fact that the airports may have very different cost and demand characteristics. This has been the approach of both Aéroports de Paris and the Spanish airport operator AENA.

SPOTTING THE INCENTIVE

So what effect do the different regulatory systems have? There is a body of evidence supporting the presumption that, other things being equal, incentive-based regulation tends to promote greater cost efficiency than cost-plus or rate of return regulation. The degree of incentive to reduce costs declines as we move down the list of the four options. Moreover, the effects are complicated by two other factors: the degree of competition in the marketplace, and the public or private ownership of the airport.

The effect that a combination of these two factors can have is illustrated by the privatisation of BAA in the UK. By transferring a group of airports en bloc, the government also created the potential for cross-subsidy between London's airports, by designating a "system-wide" Regulatory Asset Base for Heathrow, Gatwick and Stansted. This allowed BAA plc to continue to invest aggressively in the expansion of Stansted in the 1990s, despite very poor financial performance at that airport, because the group as a whole was ensured a return on its investment.

This system-based approach was abandoned by the Civil Aviation Authority (CAA) in 2002, in favour of a price cap for 2003–08. (This decision was, incidentally, made against the advice of the UK Competition Commission at the time, but most would agree it has paved the way for a more dynamic London airport sector.)

One key reason for the CAA's change of policy was concern at the prospect of BAA using its market power at Heathrow to finance a second runway at Stansted. Whether or not that concern was justified, it must be noted that BAA's enthusiasm for that second runway declined considerably after the ability to cross-subsidise was removed. The proposal for a second runway at Stansted did not even make the shortlist of options considered for a new London runway by the Airports Commission.

This is only one illustration of the fact that the complexity and wide variation in regulatory approaches is accompanied by significant differences in competitive conditions between airports. Much work has been done over the past 20 years (including by Frontier) to establish the best way of measuring these conditions, and to identify the extent to which one airport competes with another.

The answer obviously depends on the airport's physical location and the proximity of other airports, but other factors are critical. Can a "competing" airport really offer a viable alternative to passengers? How adequate are the surface transport links to each airport?

Another set of questions relates to the nature of demand for the use of each "competing" airport. Is it a major business destination, or a huge centre of population with a major outbound market to a "sun and sand" destination? Or is it one of many approximately interchangeable destinations around Europe? We see this in any number of medium-sized airports serving sun and sand destinations around Europe: they may appear to be the only means of access to the location for international travellers, and yet the airports hardly behave as if they have market power. This is because the vast majority of traffic is inbound and discretionary: if prices rise too much travellers are happy to pick another destination.

A better understanding of competition between airports is obviously critical to the development of an appropriate regulatory regime. There is plenty of evidence that economic regulation, overlaid on a potentially competitive situation, can lead to worse outcomes than simply allowing the market to take its course.

ROUNDING UP THE RESEARCH

There have been many valuable academic studies of the relationship between ownership, competition and performance in this industry. In "Privatization, regulation and airport pricing: an empirical analysis for Europe", published in the 2010 *Journal of Regulatory Economics*, Professors Bel and Fageda took a sample of European airports and demonstrated how, with respect to pricing, competition from other airports (and also, importantly, other transport modes) could decrease the potential of airports to abuse market power.

A good understanding of the nature of airport competition is also essential to a robust analysis of the impact of ownership on airport performance. Typically the effects of ownership, regulation and competition have been assessed independently. However, a more recent study has considered the joint impact of these factors.

In "Privatization, corporatization, ownership forms and their effects on the performance of the world's major airports", which appeared in the 2006 *Journal of Air Transport Management*, Tae Oum, Nicole Adler and Chunyan Yu compared productive efficiency and profitability across airports with different ownership structures, including: fully public; public but corporatised; and mixed public/private enterprises. They used cross-sectional time-series data covering Asia, Europe and North America, and their results indicated that:

- airports with mixed ownership and majority public share are significantly less cost efficient than those with a majority private share; but
- airports that are 100% government owned do not underperform majority private airports; however
- private majority-owned airports tend to generate the highest margins, and charge the highest prices; and
- such airports tend to generate a much higher proportion of their revenues from non-aeronautical services (e.g. car parks and retail space).

A later piece of work by the same team of researchers, using a different statistical approach to analyse the effects of the type of ownership on airport cost-efficiency, broadly confirms the same findings.

Meanwhile, in the 2012 *European Journal of Operational Research*, Georges Assaf and David Gillen examined the joint impact of governance and economic regulation, using a data envelopment analysis (DEA) approach. This found that the approach taken to regulation had more impact than ownership on economic efficiency.

The most comprehensive attempt to bring regulation, ownership and competition under unified analysis was carried out by Nicole Adler and Vanessa Liebert in "Joint impact of competition, ownership form and economic regulation on airport performance and pricing", which appeared in the 2014 *Transportation Research Part A*. They used a two-stage approach. First, they measured the relative efficiency of a sample of European and Australian airports using DEA techniques, which enabled them to assess the position of each airport relative to a technical efficiency "frontier" (set, in simple terms, by those airports that achieved the highest output for the lowest inputs). They then used an econometric approach to attempt to explain why some airports appear to be more efficient than others.

Adler and Liebert found that:

- in the absence of competition, fully private airports tended to perform better than public airports; and
- also in the absence of competition, incentive regulation tended to push airports to be both more cost efficient and to price more efficiently; however
- the incremental impact of regulation was the same whether the airport was in private or public ownership; while conversely
- in the presence of potential competition, regulation tended to inhibit operating and pricing efficiency; and while private airports tended to charge higher prices, they were no more cost efficient than publicly owned ones; and finally
- in line with previous research, mixed enterprises tended to perform worse on cost and price than both fully public and fully private airports.

A still more recent study by Yukihiro Kidokoro and Anming Zhang ("Forms of Airport Regulation and Privatization: Effects on Airport Charge, Capacity and Welfare", published in the 2017 *SSRN Electronic Journal*) supported these findings. It suggests that full privatisation of airports tended to support higher social welfare than partial privatisation, due to lower costs. Full privatisation, the authors argued, nonetheless required appropriate regulation: namely, price-cap regulation for uncongested airports, but cost-based regulation (to encourage investment) in congested ones.

To sum up: this research does give support to the view that privately owned airports will tend to be more cost efficient, but only where there is a lack of competition; that where there is such a lack, incentive-based regulation will improve efficiency at both publicly and privately owned airports; but that where there is competition, regulation may actually have harmful effects. The research also indicates that mixed ownership does not tend to generate the greatest cost efficiency.

Given the frequency with which the mixed ownership model is used in Europe, this is a useful warning. With the exception of the UK, Europe has been characterised by a preference for partial privatisation, which the analysis suggests may be the worst of both worlds, especially in the absence of competition. This may be because of the intrinsic conflict of interests in strategy-setting by owners with very different priorities.

Another important warning comes with the finding that competition is the most powerful influence on performance. If we look back at the history of European airport privatisation, it seems clear that the fostering of competition between airports has been low on government lists of priorities. For example:

- All Spain's airports were privatised en bloc, operated by AENA, in 2015.
- Similarly, all Portugal's major airports are operated by ANA, which was sold in 2013 as a single entity.
- Rome's two major airports, Fiumicino and Ciampino, were sold together as a single enterprise in 1997, as were the two Milan airports in 2011.
- And at the time of going to print, Aéroports de Paris, the operator of Paris's two major airports, Charles de Gaulle and Orly, is also being sold as a single entity.

The airport trade body, the Airports Council International, has consistently argued that airport groups allow larger airports to provide economic support to smaller ones that might otherwise prove uneconomic. But it is highly debatable whether intra-group cross-subsidies are the most effective or efficient way to provide support to regional connectivity. Furthermore, such arguments clearly do not apply to pairs of medium/large airports serving major urban centres.

Probably the only major push to drive greater inter-airport competition has occurred in the UK. As we have noted above, BAA was privatised in 1986 as a single group of airports. But after its acquisition by the Spanish construction giant Ferrovial, a market investigation in 2009 by the then Competition Commission ordered the break-up of the group to promote competition. BAA was ordered to sell two of its three London airports and one of its two central Scottish airports.

Although BAA fought this decision through several rounds of appeal, in the end it sold Gatwick to Global Infrastructure Partners (GIP) in 2009, Edinburgh to GIP in 2012 and Stansted to Manchester Airport Group (MAG) in 2013.

Ultimately, BAA took the decision to divest itself of all its remaining airports, save Heathrow. In 2014 Glasgow, Aberdeen and Southampton airports were transferred to AGS Airports, a wholly separate subsidiary of Heathrow's owner Ferrovial. This seems to have had a positive effect on the London airport market in particular, driving significant quality improvements and stimulating Gatwick to better use of its capacity. Paradoxically however, competition between Gatwick and Heathrow may have increased efficiency in the use of existing airport capacity, but acted as an obstacle to capacity expansion, as we discuss in the next section.

CONGESTION OR CAPACITY?

The studies discussed in the previous section were largely based on calculations of total factor productivity (TFP) at airports, a measure that combines the use of capital and labour. As airports are highly capital-intensive activities, capital efficiency can be expected to have a significant bearing on TFP. But development to an efficient scale is also essential.

As discussed above, publicly owned airports may sometimes be under pressure to expand beyond efficient scale to serve development goals (or simply national prestige). This would suggest that – taken in the round – privately owned airports are more likely to operate at efficient capacity, with fewer vanity projects and less wishful thinking.

However, empirical evidence suggests that the main capacity problem is not that there is too much in Europe, but that there is too little, especially where it matters most. Or, more specifically, there is growing evidence that investment in airport capacity at major airports in Europe is failing to keep pace with demand.

In 2018, Eurocontrol, the international organisation working to achieve safe and seamless air traffic management across Europe, published an updated version of its report *Challenges of Growth* in which it estimated that, under the assumptions in its central growth forecast, by 2040, 16 major airports in Europe will be congested "Heathrow-style" (that is, 24/7). If its higher growth forecast proves more accurate, the number of airports in this state will rise to 28.

Growth in traffic to this level, combined with the slow development of surface infrastructure, implies that in Eurocontrol's central scenario underlying demand would exceed capacity by 8%, equivalent to 1.5 million flights that passengers would like to take at normal market prices, but which the infrastructure cannot accommodate. The effect is spread across 17 European countries, possibly resulting in a seven-fold increase in the number of flights delayed by one to two hours. The cost is quantified in terms of lost time, but of course these delays mean financial costs for passengers and businesses using air services, and for the airlines themselves. Delays drive up costs but drive down the value of the service to the passenger, so actually reduce fares, other things being equal. However, as explained below, where there is insufficient competition this is counterbalanced by the effect of congestion in creating a "scarcity premium".

"PRIVATELY OWNED AIRPORTS ARE MORE LIKELY TO OPERATE AT EFFICIENT CAPACITY, WITH FEWER VANITY PROJECTS AND LESS WISHFUL THINKING"

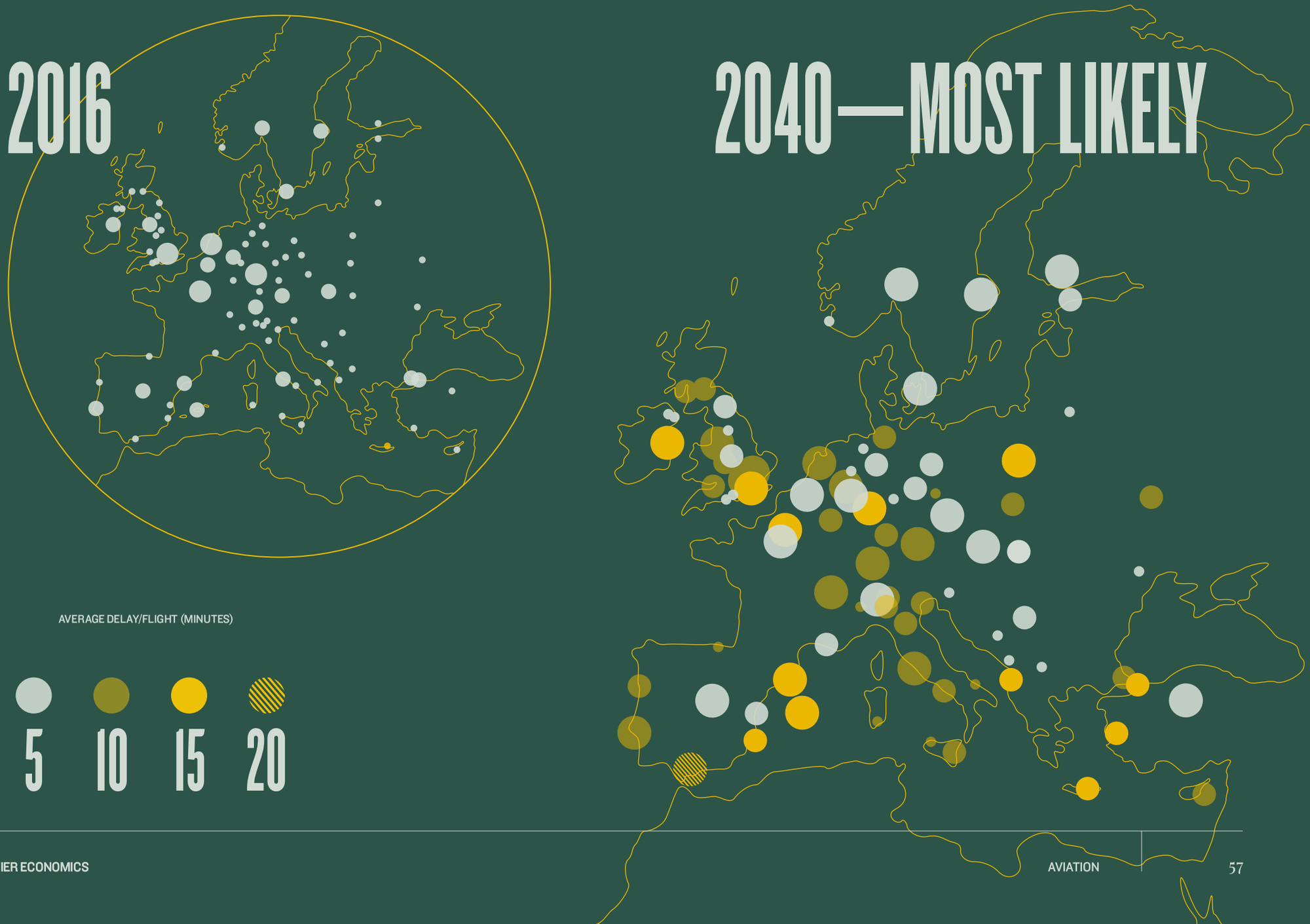
The anticipated pattern of airport congestion is shown in Figure 3.6.

Eurocontrol is not suggesting that airports are not investing in capacity at all, simply that the investment currently planned falls well short of what seems to be needed to accommodate growth.

Here too privatisation would seem to have offered an answer, and indeed has been used as such by a number of governments anxious to modernise airport infrastructure. Private ownership opens access to equity investment as well as debt finance. This has been a boon to governments constrained by concerns about the level of public sector debt. And, as discussed above, because airports can "pay their way", they provide an attractive privatisation option both to private investors and to governments under pressure to replace a whole lot of outdated transport infrastructure, much of which does not offer substantial income potential.

With easy access to capital markets, privately owned airports ought to be able to increase capacity to efficient levels, in a way that governments up against their borrowing limits may not be able to do. However, academic studies do not tend to bear out the presumption that privately owned airports will operate closer to efficient capacity than those in the public sector. In short, the degree of public ownership does not seem to be the key factor in explaining under-investment in airport capacity.

FIGURE 3.6: MORE CONGESTION MEANS MORE DELAYS



Source: Eurocontrol (2018)

PREMIUM PROBLEMS

Why is there insufficient investment in capacity at major airports? There seem to be two answers: economics and politics. So far as the economics of privatisation are concerned, the benefits it brings in terms of the availability of different sources of finance are dwarfed by the effects of competition (or the lack of it), the most dominant factor in determining whether or not expansion takes place.

In economics, it is assumed (or at least hoped) that competitive markets put pressure on companies both to operate in an efficient manner on a day-to-day basis, and to invest in capacity in a way that makes them cost efficient. The forces of competition are, therefore, assumed to operate in such a way that sufficient capacity will be created to meet demand (in the absence of unexpected shocks).

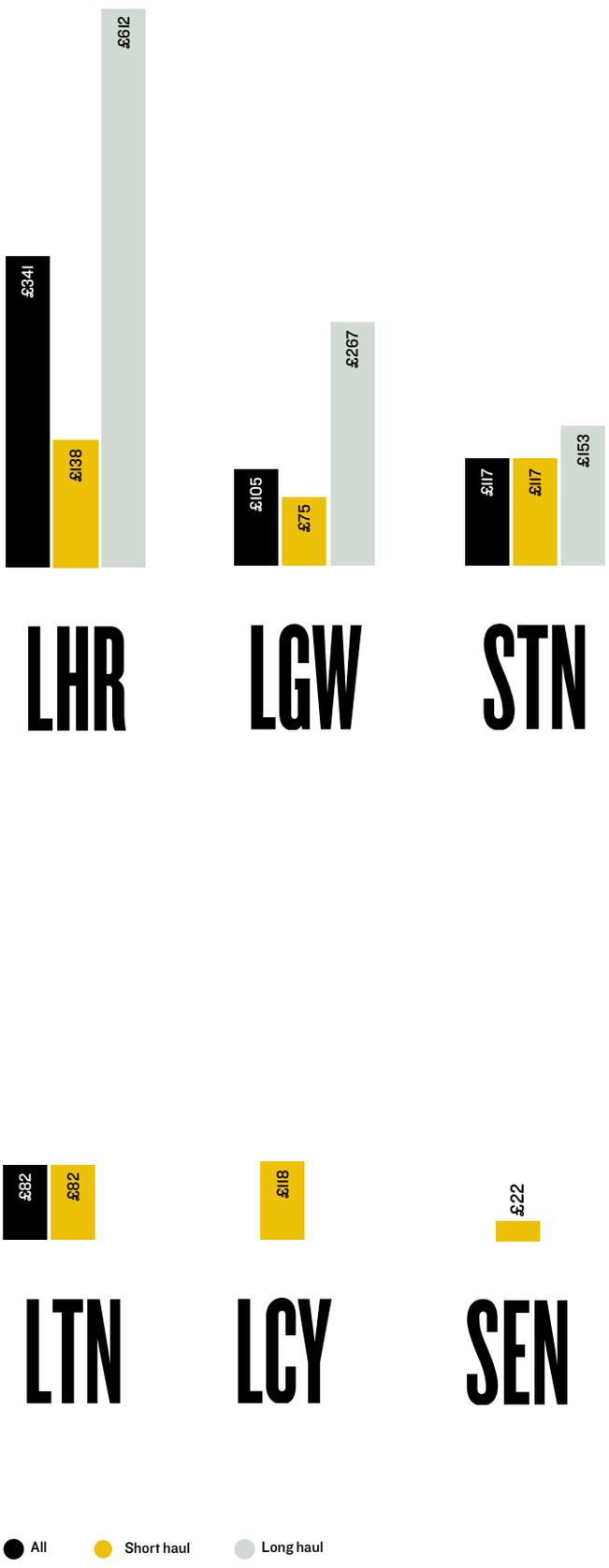
The dynamic is simple enough: if there is not enough capacity in the market to meet demand, prices will start to rise. This acts as a signal to suppliers to increase capacity, because higher prices mean higher profits. In textbook competitive markets it is an open question whether this new capacity is provided by incumbent firms or new entrants. In slightly more real-world, but nevertheless broadly competitive markets, it is usually assumed that incumbents will have a strong incentive to increase capacity, or risk losing market share – either to rivals prepared to do so, or to new entrants.

However, none of these economic forces work on airport capacity, particularly not if the market is supplied by regulated airports exposed to limited competition. This is because first, aeronautical charges (to airlines) at regulated airports do not typically rise as the airport becomes full – indeed, if charges are set on an average cost basis, they may actually fall as the airport becomes congested. It is also because, second, if there is no viable competitor, the incumbent airport is under no threat of losing market share. So there is no external pressure to expand capacity either.

The key point is that it is competition, rather than ownership, that is the critical factor. If the airport has a genuine competitor, then fear of losing market share will encourage it to expand. Focus on market share will make this true even if there is no price signal to do so; and congestion may cause airlines to switch even if they are not being charged more.

By contrast, if the airport has no local competitors, then airlines cannot switch. Moreover, passengers will not be able to choose to fly to or from another airport (or at least not in sufficient numbers to create a competitive discipline). If the airport is full, and demand is rising, this tension has to be diffused somehow, and this is likely to happen through an increase in fares at the congested airport (which is what is sometimes referred to as the "scarcity premium").

FIGURE 3.7: AVERAGE ONE-WAY FARES AT LONDON AIRPORTS IN 2018



Source: OAG online fare data, Frontier Economics calculations.

The existing regime for allocating runway slots at congested airports serves to exacerbate this uncompetitive situation, by giving incumbent airlines significant control over the slots they use, presenting a further barrier to entry. However, slot ownership and control rules do not create this premium; rather, they determine who benefits from the proceeds.

Airlines tend to dispute vehemently the existence of this premium, pointing to the contestability of airline routes – the fact that even at constrained airports airlines can switch capacity between routes – as a reason why such a premium could not exist. But if the airport becomes very full, passengers do not have a viable alternative and slot constraints prevent entry, the excess demand has to make itself felt somewhere. On a road, this means traffic jams, but at an airport, more flights cannot simply "turn up", so the "somewhere" that excess demand has to be felt turns out to be in pricing.

There is, in fact, ample evidence of the way excess demand crystallises into hard cash in the fact that slots at congested airports change hands for substantial sums of money. For instance, in 2018 Oman Air purchased a pair of peak-time slots at Heathrow for $75 million, while Virgin Atlantic is reported to have used its slot portfolio as collateral in a $200 million bond issue.

The congestion premium is a substantial potential source of lost consumer welfare. During the Airports Commission investigation into a new runway in the south east of England, in 2014 Frontier submitted statistical evidence on behalf of Heathrow. This indicated that the average long-haul fare at Heathrow was, in 2012, 18% higher than at other London airports, after making proper allowance for the effect of differences in distance, cabin class and so on.

A repetition of this analysis by Frontier in 2018 found that the Heathrow premium had risen to 23% by 2017. (Figure 3.7 presents a simplified version of this comparative analysis, before adjustment for factors such as the greater prevalence of business class at Heathrow.) We estimated that the cost of this premium to passengers had, by 2017, risen to £2 billion a year. So, even though the estimated capital cost of expansion at Heathrow amounts to £14 billion, it is easy to see that this is outweighed by the ongoing welfare loss resulting from the lack of capacity.

NOW ADD POLITICS

Crucially, none of the effects described above hinge on the nature of the airport ownership. When private or public, the airport simply does not receive any economic signal to undertake "efficient" expansion, if it is not subject to competition. So while private ownership may provide the funds for airports to expand, it does not necessarily provide the economic incentives to do so.

The second set of obstacles derives from politics. Private ownership only resolves this set of problems in so far as it removes the need to compete with other services, such as health or education, in the queue for public funds. The development of airports, especially those close to, or embedded in, densely populated areas is a highly political and fiercely contested issue, wherever ownership lies.

Setting aside the contentious issue of greenhouse gas emissions from more flying, airport expansion may bring huge disruption in terms of aircraft noise. This may affect wider and different populations as flight patterns change, and the issues are exacerbated by the impact of increases in surface traffic to and from the airport. In major urban centres such as London, this traffic may have a serious impact on air quality – a major element in the Heathrow debate. Then there are the effects a sudden expansion may have on local services, schools, hospitals and so on, to be considered by policy-makers.

The trade-off between the potential national economic benefits of airport expansion, and the likely local environmental and social disbenefits, inevitably makes airport expansion a sensitive political decision. The issues are too sensitive, the complexities too great and the economic spillovers too complex for it to be reasonable to suppose competitive markets will on their own arrive at a socially acceptable outcome. Moreover, electoral processes in a democracy will make sure that they are not left to do so.

Neither Heathrow nor Gatwick could develop a runway without direct political support from central government. Without that, any such proposal would simply fail to overcome the constraints of local planning, regulations designed to protect local communities and the environment, and the resistance of local pressure groups.

In theory, private ownership, with a promise of greater efficiency, should be at no disadvantage in the planning process. In public debate, however, it may well be. The fact that an airport is being expanded in pursuit of private profit tends to intensify at least one strand of political opposition.

Most people can, at least in theory, perceive the need for balance of national and local economic interests, even if they naturally tend to put their own interests first. But when private investors stand to benefit, deaf ears are likely to be turned to the argument that all capital needs to be paid for, that shareholders are simply earning a fair return for the financial risk they are taking, and that many of these shareholders are in fact the pension funds on which the protesters themselves depend. It is notable that in the London airport debate local MPs, regardless of party, lined up to oppose the choice of their local airport for expansion and that government felt obliged to allow a free vote.

The second way in which private involvement may complicate the matter of capacity planning is that it can generate private rivalries that have little to do with the public interest. The decision as to where to place London's next runway was not helped by competition between two private rivals.

There is, of course, a Hayekian view of this process that would see this competition too as a creative process that could, in the long run, lead to the best (market) outcome. The two companies would be forced to engage in an enlightening debate. But the reality was nothing like that.

Given all the environmental and political obstacles outlined above, there was (in the political arena, at least) only space for one runway. And instead of the choice becoming a matter of impartial and dispassionate analysis in the national interest (an admittedly improbable process), it became a completely predictable fight to the death between two private companies, determined to avoid losing the option value of future expansion.

The UK Airports Commission did exemplary work picking through the evidence and providing clear guidance to government on where the public interest lay. But the process of choosing the runway location was painfully elongated by the clash of commercial interests and the losers' subsequent attempts to delay, defer or overturn the result. As late as mid-2019, the process is still subject to uncertainty, as Gatwick seeks judicial review of the government's decision in favour of Heathrow.

Of course a publicly owned airport system would also face problems with planning and responsiveness to public needs. But for all the benefits that may have arisen from the privatisation of the London airports and the break-up of BAA, here is one contrary factor: private ownership may have delayed the process of expansion.

CONCLUSION

This chapter has tested the theory of privatisation against real experience in the complex and politically sensitive world of airports. To do so, we have had to examine both operational efficiency and capacity planning, and to allow for politics – in the broadest sense of public acceptability – as well as economics. Some conclusions stand out:

- Private operators do tend to be more efficient than public ones, but the difference is only clear where there is little or no competition.
- Effective (i.e. incentive-based) regulation can improve the performance of both – but again, only where there is a lack of competition. In competitive markets, regulation of airport charges may be counterproductive and destructive of efficiency.
- In short, competition may be a more important driver of performance than either regulation or ownership, and regulation overlaid on a competitive market may do active harm.
- Moreover, mixed public-private ownership seems to deliver the worst of all worlds in terms of efficiency.

This should sound a warning bell throughout Europe, where mixed models are commonplace, competition has not been a focus of airport policy, and the regulation of charges the default presumption, whether or not an airport has been shown to have market power. However, the balance of advantage between these economic models shifts somewhat when we bring capacity planning into the equation.

Neither publicly nor privately owned airports demonstrate a particularly good performance on this score. Publicly owned airports suffer from government desires for over-large vanity projects, which drive down operating efficiency in the short to medium term; or alternatively from fierce competition for public sector funds, which constrains investment even when there is a reliable flow of income to be earned from user charges. But private ownership, which brings freedom from public sector borrowing constraints (and access to equity capital), may also intensify public opposition to develop or reduce the political process to an existential fight between commercial rivals.

The UK's approach, which accords with the findings of research by permitting full private ownership, and enforcing competition, has illustrated the complicating effect of such rivalries. It is possible that the concession approach, whereby government creates competition for the market while retaining responsibility for capacity planning, may offer more advantages than is generally supposed – although the history of concession-leasing in rail transport is not entirely encouraging.

Since the impact of competition seems to be much more powerful than ownership as a driver of efficiency, any economic model designed for airports should put that first. And when there is a prospect of competition, ownership tends to matter much less, so the introduction of competition, rather than private involvement, may be the most effective way of promoting efficiency. It is difficult to avoid the conclusion that inter-airport competition has been too low on the list of priorities for privatising governments, and that this may not be unconnected to the impact such a policy might have had on the proceeds of airport sales.