

PRICE DIFFERENTIATION IN THE CONTEXT OF AIRPORTS

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EXECUTIVE SUMMARY

Frontier Economics has been commissioned by ACI EUROPE to report on the economics of price differentiation in the context of airport charges and to comment on the role of private bilateral agreements between airports and airlines – i.e. where airlines negotiate airport charges that are different to the published charges. While bilateral agreements tend to be confidential, we understand that they are now relatively common amongst airports in Europe.

We present a review of academic literature on price discrimination, and also a review of how competition authorities, such as the European Commission (EC), approach the question of price discrimination:

- Literature review: This suggests that when upstream suppliers have relatively high fixed costs and low marginal costs, such as infrastructure providers (in general, and not necessarily just airports), price discrimination is likely to improve the efficiency of use of upstream infrastructure and intensify the competition in downstream markets. It is generally found that discrimination that results in more intensive use of the infrastructure will be welfare enhancing overall.
- Competition authorities: The EC tends to only be concerned with cases of price discrimination where it can be demonstrated that the supplier has significant market power. In the context of bilateral agreements, we note that the application of the European Airport Charging Directive (ACD) does not imply that the airports in question automatically have significant market power. Some may, but it is likely that many do not. For instance, in the UK, only two airports, Heathrow and Gatwick, are deemed to have enough market power to require licencing under the relevant Act, while a further 11¹ are subject to the Directive. Also, having established significant market power, the EC's primary concern is not with discrimination *per se*, but rather with whether this has had any anti-competitive effects.

Before commenting on bilateral agreements, we note that virtually all large airports in Europe engage in some price *differentiation*. But this generally tends to come in the form “unbundling”, and not price discrimination in the academic sense. Airport charges are differentiated in that airlines may pay different average charges per passenger, because the service provided by the airport is made up of many different sub-services and different airlines consume these services in different proportions. Airlines make different use of these services, depending on their business model, for instance low cost carriers typically do not make use of air bridges and spend less time with aircraft parked at contact stands than full service or long-haul carriers. Therefore, the differentiation engaged in by airports is better understood as “unbundling” of services to ensure a better targeted and more cost-reflective service for airline customers. There is naturally a limit to how far differentiation can go, and in some cases more ‘bundling’ would be efficient.

¹ Manchester, Stansted, Luton, Edinburgh, Birmingham, Glasgow, Bristol, Belfast International, Newcastle, Liverpool and London City.

And we also note that many airports engage in price discrimination, in the academic sense, through their use of published incentives such as new route incentives and volume discounts:

- New route incentives:
 - This pricing behaviour is common across airports of all sizes, provided the airport has spare capacity. Discounts for new routes is a rational commercial strategy that leads to greater use of the airport infrastructure as a whole, and hence spreads airport fixed costs over a wider range of services, reducing average costs. It should, therefore, be expected to be welfare enhancing overall.
 - Moreover, as these incentives are focussed on new routes there is no reason to anticipate anti-competitive effects between carriers occurring because of this pricing. Treating individual routes as separate markets (in line with the typical approach of European anti-trust authorities), the fact that the routes are new to the airport means there would not be expected to be other carriers on the same route who could claim to have suffered a disadvantage.
- Volume incentives:
 - This pricing behaviour is also common across many airports in Europe. The size and structure of the discounts vary from airport to airport; however, the general approach is that airlines that grow volumes faster than a target set by the airport receive a discount to their airport charges.
 - For airports with spare capacity, the incremental cost of handling extra volumes is likely to be relatively low. This has the effect of decreasing average costs, and also increasing non-aeronautical revenue, and there is a question as to how this benefit is shared. In the medium run, the benefit is likely to be passed through to all airlines in the form of lower airport charges. However, in the short run, the benefit is (at least partially) passed through to the airline that is driving this growth – i.e. the airline that triggers the volume discount pays lower airport charges. In this respect, the discount can be considered cost reflective. And the incentive is available to all airlines that beat the growth target.

Outside of published airport tariffs, bilateral agreements between airports and airlines tend to reflect the varied and bespoke nature of airline requirements and long-term commitments by airlines. Published aeronautical charges apply for a year or a season, and do not readily allow for the possibility of the airline and airport entering into a longer-term commitment. However, there is considerable mutual advantage from this sort of arrangement. By obtaining long-term commitments from based carriers the airport can obtain greater security over future levels of traffic and so can plan and finance future capacity more efficiently, the airline gains by being able to share in this benefit in a way from the standard tariff.

Ultimately, it is not possible to assess empirically the impact of bilateral agreements on the sector because the details tend to be confidential. We have tested instead whether there is any evidence to suggest that published incentive schemes have

had a positive impact. As noted above there are parallels between published incentive schemes and bilateral agreements.

We have analysed how traffic volumes and the number of routes at the largest 100 airports in Europe evolved over the period 2015-2019. Of the fastest growing airports, most of them do indeed appear to have strong incentives. We cannot say for sure that these airports have grown faster than the others precisely because of their incentive schemes. And indeed, it is plausible that the airports with the strongest incentives might not have experienced high levels of growth. (It was outside the scope of this project to review the published charges and incentives of all of the airports in the analysis). Also, it is highly plausible that the large growth rates might have been driven by bilateral agreements, which of course are the main focus of this report, but we cannot observe them.

While airport charges and published incentives are just one component in the overall airline cost structure, in a sector with low margins airlines should be expected to respond to incentive schemes, and the same is likely even more true in the case of bilateral agreements where discounts may be even larger. By reducing overall costs for airlines and thereby boosting the viability of adding extra capacity, we expect that bilateral agreements do lead to an increase in volumes which is a positive outcome for passengers using those airports.

With European airports becoming ever more congested, the development of airport capacity proving increasingly contentious and the need for aviation to contribute to GHG targets - which in part means accommodating passenger growth within the fewest feasible aircraft movements - there is a pressing need to ensure that airports individually and collectively are able to make the most efficient use of the capacity they have. Facing highly competitive airline markets, the key lever airports have to affect this is through the flexibility of their charging mechanisms.

It would be unfortunate if the sector finds itself hampered by well-meaning but poorly conceived regulatory constraints which make dealing with these challenges all the harder.

1 INTRODUCTION

Frontier has been asked to prepare this paper by ACI EUROPE to address the legitimacy, in some jurisdictions of bilateral agreements between airlines and airports relating to charges for aeronautical services when that airport is itself subject to the European Union's Airport Charges Directive (2009/12/EC).

Our understanding is that deals of this nature occur routinely but are by no means ubiquitous. They are, in our opinion, a feature of an increasingly competitive airport sector.

A key fact about the operation of airports is that the overall "aeronautical service" which they provide is made up of a multitude of different sub-services. Airlines vary significantly in the extent to which they and their passengers make use of these different services, and the indeed in the costs which their business models and behaviours impose on the airport.

In addition, airports as a provider of an intermediary service to airlines, use a common infrastructure to serve many different economic markets, viewed from the perspective of the ultimate consumer – the travelling passenger. Specifically, airports serve airlines flying to many different destinations, which themselves are often not substitutes from the point of view of the consumer.

Furthermore, airports are capital intensive with significant costs relatively unaffected by output (aircraft movements or passenger numbers) in the short- to medium-term. This means they operate in a situation where their short-term *incremental* costs tend to be lower than their average costs, which presents a challenge to achieve profitable operations in a competitive environment.

Airports have an impact on the local community and constitute a part of a carbon-intensive sector, and in recognition of impact on climate, European airports have for years taken steps to reduce exposure to noise contours through tools including financial mechanisms applied on aircraft operators, and today seek to reduce the contribution of airports to greenhouse gas emissions, as well as nudge aircraft operators towards less carbon-intensive operation, to the limited extent possible.

All these factors combine to create conditions in which we would expect airports, faced by an increasingly competitive commercial environment, to develop pricing strategies and take business decisions about (dis)aggregation and differentiation of charges (the distinction between the two is important as we will argue below) that drive the airports' business objectives.

Private bilateral contracts can be seen as a manifestation of this trend, reflecting among other things, the highly bespoke nature of the particular bundle of services that any given airline requires from its airport.

1.1 The economics of price differentiation

The issue of price differentiation, more often referred to by the technical description price “discrimination”, has been addressed extensively in the economics literature.

In very simplified terms, this is a literature regarding the economic efficiency, or otherwise, of selling appreciably the same product or service to different customers for a different price.

From the outset we need to draw a distinction between “discrimination” in this formal sense, and “unbundling” of charges, which is an increasingly common practice among airports, which reflects circumstances where, in reality, airlines may be placing very different demands on the airport and are being charged different prices for differing services received. We will return to this distinction further in this paper.

As regards the literature on price discrimination in the formal sense as outlined above, the work typically starts from the recognition that in conditions where a firm has high “fixed” costs and low “variable” costs some variation from the competitive “paradigm” of marginal cost pricing is required if the enterprise is to be financially viable, because it needs to recover its fixed costs somewhere.

In these circumstances a uniform one-size-fits-all approach to pricing can quite easily be shown to be inefficient from the point of view of promoting the highest possible level of economic welfare. In short price discrimination, charging different customers different amounts for ostensibly the same service, can improve economic efficiency.

This does not mean, of course, that *any* price discrimination is justified. Hence the literature largely concerns itself with gaining an understanding of when and how discrimination may, or may not, enhance economic welfare.

In the real world, competition authorities are also familiar with the concept of price discrimination and have developed their own approach to assessing when it may or may not be acceptable, noting that competition law only exists to address the potentially damaging behaviours of companies which have significant market power. Competition law is not conceived of as a means of regulating the behaviours of competitive businesses.

Competition authorities are also familiar with the concept of the private bilateral contract, which is routine between upstream and downstream firms in competitive markets.

1.2 How does this apply to airports?

We observe increasing evidence of airports disaggregating and differentiating their charges, which is not surprising given their cost structure. So, it is valid to consider what lessons can be drawn for airports from the general economics literature, and the practical evidence of the application of competition law.

It is worth noting, however, that while airports may typically have high “fixed” costs and low “variable” costs this does not mean that airports cannot be operating in a “competitive” environment.

These conditions do mean that to recover their fixed costs airports require some degree of differentiation from each other, i.e. that airports are not *perfect* substitutes for each other from the passenger's point of view. Physical location is, of course, the most obvious differentiator (you can have too many airports in one place). But even when airports are not perfect substitutes they can, in many circumstances, compete with effectively with each other without the need for ex ante regulatory intervention, as demonstrated by the fact that in the UK only two airports are subject to any form of economic regulation while none of the airports in Australia are directly regulated.

Of course, this is not to say that no airport has market power. Some airports almost certainly do.

A ruling in November 2019 by the European Court of Justice ("the ECJ") in the case between Lufthansa and the Land of Berlin, regarding to the interpretation of the Airport Charges Directive ("the Directive")² suggested that airports should not be allowed to diverge from pricing approved by a supervisory authority.

The ECJ's ruling is curious from an economic point of view (we make no attempt to comment on the law) because it relates to the provisions of the Directive, the application of which does not of itself imply that the airport has significant market power.

Indeed, the Directive applies across the board to all EU airports with more than 5m passengers per year, without any requirement for a market power test. The Directive is not "economic regulation" per se, in that it does not dictate processes to determine a maximum level of aeronautical charges, but rather places requirements on relevant airports to consult on their (public) charging schedules and to provide an "objective justification" for those charges. This justification may be, but is not restricted to, cost reflectivity.

In this context the ECJ's ruling on bilateral contracts adds further restrictive weight to a regulation that already places limitations on airports freedom to set charging levels and structures, without requiring evidence of the presence of market power, let alone any suggestion of actual or potential abuse.

While the Directive was clearly framed with a mindset that it protects airlines, and by implication passengers from potentially harmful practices, its application without the use of a market power test is problematic. The ECJ's ruling adds more weight to that problem ruling in its potential to obstruct the freedom of airports operating in effectively competitive markets to strike commercial deals to make more effective use of their infrastructure.

This is of wider concern than simply the commercial interests of individual airports. With European airports becoming ever more congested, the development of airport capacity proving increasingly contentious and the need for aviation to contribute to GHG targets - which in part means accommodating passenger growth within the fewest feasible aircraft movements - there is a pressing need to ensure that airports individually and collectively are able to make the most efficient use of the capacity

they have. Facing highly competitive airline markets, the key lever airports have to affect this is through the flexibility of their charging mechanisms.

It would be unfortunate if the sector finds itself hampered by well-meaning but poorly conceived regulatory constraints which make dealing with these challenges all the harder.

1.3 This report

In this paper we start by presenting a brief review of the economics of price discrimination. Looking at the issue in generality then drawing attention to some papers that specifically consider the issue in the context of airports. We then go on to briefly review how competition authorities have generally viewed the discrimination from a competition law point of view.

We do this to provide theoretical and practical context for the subsequent review, where we consider the issue of how airports set prices and in particular how they do so in ways that result in different airlines facing different average charges.

A major purpose of this review is to highlight that the majority of airport price differentiation does not conform to the economic model of discrimination: it relates to unbundling a complex series of sub-products and setting differential charges based on the different use that airlines make of airport facilities.

Nevertheless, there are instances of pricing policy that more closely resemble price discrimination, in particular offering airlines incentives to develop new routes, where demand, rather than cost conditions tend to dictate pricing policy. We explore the commercial rationale for why airports price in this way. The view we express here is that price differentiation by airports, whether it relates to unbundling of costs or sharing of new route commercial risks, is likely to promote stronger, more cost-related inter-airline competition and more efficient use of airport infrastructure.

After our review of how airports set charges we briefly consider the competition issues that could possibly arise as a consequence. We then present some high level empirical analysis to consider the impact of bilateral agreements on outcomes in the sector.

2 AN INTRODUCTION TO PRICE DISCRIMINATION

Price discrimination is a form of dynamic pricing in which identical goods (or services) are sold at different prices to different consumers in an effort to maximize sales and profits. In the economic literature, three theoretical forms of price discrimination are typically defined, each with different welfare implications:

- **First degree discrimination**, where a seller charges each customer their maximum willingness to pay. This theoretical model transfers all consumer surplus to the seller but has no overall “welfare effect” because consumption is unchanged. In this case consumer surplus is simply transferred to the producer in higher profits.
- **Second degree**, occurs when prices differ on the number of units of the good bought (e.g. volume discounts), but not across consumers: each pays the same for a given volume. The literature shows that this sort of behaviour can be welfare enhancing or decreasing, depending on how specific conditions.
- **Third degree**, occurs when different purchasers are charged different prices for the same product or service, but each purchaser pays a constant amount for each unit of the good bought. The literature tends to find that this behaviour is welfare enhancing if output is increased. Third degree price discrimination is the focus of most of the literature directly relating to airports.

It should be noted that differentiated charges are common in well-functioning markets and tend to enable competition and welfare improvements through various channels, as will be outlined in the literature reviewed subsequently. In summary, under many market conditions, price discrimination can increase efficiency of costs, flexibility of pricing and the intensity of competition in the market. Indeed, there is no presumption in either economics (nor the practice of competition law) that the use of price discrimination is harmful or should be discouraged.

2.1 A theoretical example of third degree price discrimination in airports

An airport can, in simple terms, be characterised by relatively high fixed costs and low marginal or incremental costs, especially in the short to medium-term. Consequently, airports typically operate with a downward-sloping average cost of supply, because marginal costs are comparatively low and below average costs.

Figure 1, below illustrates the opportunities and benefits of third degree price discrimination in these circumstances. For simplicity we assume here that the airport faces a demand curve D_1 , from its customers as a whole. It has a downward-sloping average cost curve because it has a high level of fixed costs, and in this case marginal costs are assumed to be low and constant.

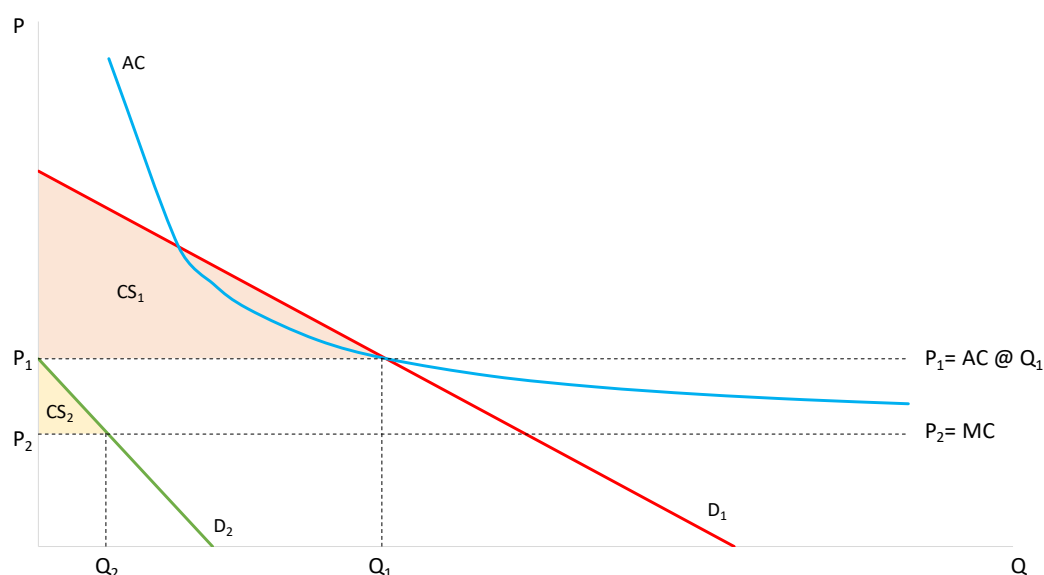
In this case, to cover its costs and earn a normal rate of profit, the airport will need to charge P_1 to all customers. This generates a level of consumer surplus CS_1 , equal to the area of the pink triangle³.

Now, suppose the airport is presented with the opportunity to serve a new, small group of customers with different demand characteristics. The demand from this group is small and more price elastic. It is represented by the demand curve D_2 .

From Figure 1 we can see that at price P_1 the demand from this group will be zero. However, if the airport can charge this group P_2 , equal to its marginal cost, then this second group will consume Q_2 and generate consumer surplus CS_2 (the yellow triangle).

Provided the first group of customers continues to be charged P_1 , then their demand and consumer surplus remains unchanged. Hence third degree price discrimination increases both total output (Q_1 plus Q_2) and total consumer welfare (the sum of CS_1 and CS_2). Furthermore, because the airport only charges marginal cost to the small second group there is no generation of excess profits.

Figure 1 Example illustrating third degree price discrimination



One final point to note is that for this arrangement to generate the benefits described, the airport must be able to differentiate between the two groups of customers and keep them separate. Without this, customers in the first group would understandably opt for the lower tariff, P_2 . But as this is below average cost, it would not be sustainable in the long run. In that case, price discrimination would fail and pricing would have to revert to P_1 for all customers, which, as shown here, results in lower output and consumer welfare.

³ It should be noted that P_1/Q_1 is not the monopoly outcome where marginal revenue is matched to marginal cost. Rather, it represents the expected outcome either where the airport is price regulated or where it is subject to an effective level of external competition. This simplification is not important for illustrating the core benefit of third-degree price discrimination and much assists in clarifying the graphical representation of the issue.

It should be stressed that this is a simplified example. For a variety of reasons airports do not always face conditions of downward-sloping average costs. Nevertheless, this is likely to be the case in airports operating with excess capacity and the above example illustrates the advantages of third-degree price discrimination in those circumstances.

3 A REVIEW OF THE EXISTING PRICE DISCRIMINATION LITERATURE

3.1 General literature

The seminal paper in price discrimination actually published a century ago: Pigou's 1920, "*The Economics of Welfare*". This first defined the aforementioned different forms of price discrimination and explored their welfare implications. Subsequent papers have explored how varying market structures react to these forms of discriminatory prices, and the welfare implications on each of these.

In general, the literature consistently agrees that price discrimination can normally only take place if the seller has *some* degree of market power. This allows them to set differential prices given that buyers have restricted outside options (at the limit, not to buy at all). Contrary to the research on who can effectively price discriminate, the research shows an ongoing debate with regard to the welfare effect that this pricing structure has on the agents in the market. In particular, how the welfare effect can differ depending on the market structure in question.

First, the literature outlines that allowing firms to engage in price discrimination can result in the implementation of efficient prices in certain cases (Armstrong 2006)⁴. At the extreme of this is the previously mentioned case of first degree price discrimination, where all consumer surplus becomes producer surplus.

However, there are further instances in which total welfare of the market unambiguously increases, although the impact on some consumers in the market may be negative. An example of how these efficiencies arise can be seen in reference to the flexibility of pricing⁵:

In an airport setting, for example, higher prices during peak-demand periods may allow for a more efficient use of capacity. Thus, price discrimination can increase the flexibility of pricing in markets, which in turn can lead to efficiencies.

Secondly, the literature also *consistently* discusses how price discrimination is likely to be welfare enhancing in those industries which are characterised by high fixed costs and low marginal costs. This is, of course, relevant when we are thinking about airports, which typically exhibit this sort of cost structure.

Spector et al (2005), outline market characteristics under which price discrimination can bring benefits in their detailed discussion paper and make the following remarks:

- *"When marginal costs are close to zero, any positive price provides a firm with a contribution to fixed costs"*
- *"There may be no uniform (i.e. non-discriminatory) price that will allow the firm to cover their fixed costs"*

The latter example above alludes to another commonly cited welfare benefit of price discrimination: that non-uniform pricing can in fact lead to an opening of

⁴ Price Discrimination (Armstrong 2006)

⁵ The Pros and Cons of Price Discrimination (Spector et al 2005)

markets that would otherwise be unprofitable, which is welfare enhancing for the markets that are served in this way. Similarly, Spector, et al (2015) also refer to the fact price discrimination might stimulate profits so as to enable investment projects, which could not otherwise be undertaken. Thus, particularly in higher fixed cost industries, price discrimination may sometimes be necessary for production to take place and to continue investment in production.

The consensus on the welfare benefits of price discrimination was reinforced from a regulatory perspective in the following assessment by the OFT, the previous UK competition regulator, in 1999:



“Where marginal costs are below average costs, however, discriminatory pricing arrangements are likely to be preferable to (that is, more efficient than) uniform prices, as explained above. The more that price discrimination results in increased output or indeed opens up new markets (for example, off-peak rail travel for price sensitive travellers such as students, pensioners, families), the more likely it is to have a beneficial impact on economic welfare.”

- UK OFT (1999) Assessment of Individual Agreements and Conduct: (para.3.13.)

This quote leads us on to one of the most important findings in relation to the welfare effects of price discrimination: in general, where price discrimination leads to an increase in total sales, total consumer welfare is likely to be improved relative to the benchmark of uniform prices. This was the case in the theoretical airport example provided above, where quantity increased as a result of a new market being served.

The first researcher to explore this idea was Schmalensee (1981), who found that in a monopolistic firm setting with a weak and a strong market, the net change in welfare generated by price discrimination can only be positive if the total market output expands (i.e. only if the increase in sales to the weak market exceeds the drop in sales to the strong market). Varian's (1985) highly quoted paper took these findings further and applied them to softer market conditions, finding that a necessary condition for price discrimination to increase social welfare (under certain market conditions) is for output to increase.

Typically, this occurs when customers with more price sensitive demand are charged lower prices than those with less price sensitive demand. It is a generalisation of a principle identified by Ramsey in the 1930s and commonly referred to as “Ramsey pricing”

PRICE DISCRIMINATION AND SOCIAL WELFARE

Varian (1985): Varian proves in his paper a necessary condition for price discrimination to increase social welfare is that output must increase, holds in many cases – including the following

- Under quasi linear demand
- The case of constant marginal costs
- The case of increasing marginal costs

Price must be greater than the marginal cost at the non-discriminatory price, so an increase in output is a necessary condition for welfare to increase under any of the above.

Varian finds that if the profitability of the new output exceeds the profitability of the old (lower) output, valued at the new prices, then welfare must have risen at the discriminatory equilibrium. As such, output increasing is a necessary condition for social welfare to increase under a price discriminatory arrangement in comparison to a non-discriminatory arrangement.

Whilst the literature on price discrimination refers to the general case of price discrimination in a monopoly, or monopolistic market, there is also a broad spectrum of literature applying price discrimination models to various market forms.

In markets that are reasonably competitive, the literature refers to an additional benefit from price discrimination, in that competition can be intensified and market power reduced. In 1998, Corts studied price discrimination in a model with vertically differentiated oligopoly and found price discrimination may intensify competition by giving firms “*more weapons with which to wage their war*”.

THIRD-DEGREE PRICE DISCRIMINATION IN OLIGOPOLY: ALL-OUT COMPETITION AND STRATEGIC COMMITMENT

Corts (1998): Corts introduces a model of a vertically differentiated oligopoly, with the possibility to price discriminate.

He finds that allowing firms to set market specific prices through discrimination breaks the cross-market profit implication of aggressive pricing moves that may restrain price competition when firms are limited to uniform pricing. Thus, firms may price more aggressively in some markets when permitted to discriminate.

If firms differ in which markets they target for this aggressive pricing and competitive reactions are strong, prices in all markets may fall, which indicates that competition can become more intensive as a result of the price discrimination. Accordingly, there will be a positive welfare effect of this action for consumers.

The real-world example that motivated Corts work in the area is summarised in the following excerpt from a 1992 article in the New York Times, that found discriminatory prices in retailers resulted in lower prices for all.

“Conventional retailers found themselves selling the same brand-name goods their customers could buy in discount stores for 25 to 40 percent less, and thus the price wars began.... Merchants now treat their shoppers to a rich diet of one-day sales, pre- and post-holiday sales, seasonal sales and clearance sales, sacrificing their profit margins in the process. “Now they're competing with us, and the upshot is that everyone's bottom line has suffered,” said Gene Kosack, president of NBO, the chain of off-price men's clothing stores.”

Other contributions to the literature focus on the impact of price discrimination in intermediate, or input good markets, for instance Inderst and Valletti (2009) and O'Brien and Shaffer (1994). This literature is particularly relevant to the case of the airports, as a result of the downstream competition between airlines, and the fact that airports often are subject to demand side substitution. The papers find that banning price discrimination has two potential negative effects:

- It renders downstream bargaining power useless and results in more upstream market power, higher input prices, and thus higher end prices for customers and large welfare losses are possible.
- If the threat of demand-side substitution for the downstream competitors is strong enough, more efficient firms will receive a discount relative to their lower efficiency competitors if price discrimination is allowed. Thus, banning price discrimination results in lower consumer surplus, and welfare.

PRICE DISCRIMINATION IN INPUT MARKETS

Inderst and Valletti (2009): If a downstream firm, such as an airline, has a viable threat of demand-side substitution, i.e. it could choose to relocate to another airport serving the same market, then more efficient firms will now receive a discount compared to their less efficient rivals under price discrimination.

This shows that in the long run a ban on price discrimination may serve to reduce consumer surplus and welfare through stifling both airport and airline incentives to invest and innovate.

In fact, a ban on price discrimination between airlines can even amplify differences in firms' long run competitiveness, that is make it harder, not easier for less efficient airlines to compete effectively.

Application to Airports/Airlines:

- Clear application to the case of more footloose carriers, e.g. LCCs on comparison to relatively full service or legacy carriers that may have less flexibility to relocate services to alternative airports.
- Where “static” implies outdated business model, there is a strong efficiency argument, benefitting passengers, from pricing to encourage a more efficient, competitive model.
- Where “static” implies a different business model, e.g. network carrier providing connecting services, then discrimination justified (and welfare enhancing) from routine third degree price discrimination arguments

THE WELFARE EFFECTS OF FORBIDDING DISCRIMINATORY DISCOUNTS

O'Brien and Shaffer (1994):

In this paper, O'Brien and Shaffer examine the welfare effects of forbidding price discrimination in intermediary goods markets. In this context airport services are an "intermediary" market because airports supply services to airlines that in turn use the airport as an "input" into providing transportation services to passengers.

Their model involves the assumption that firms can bargain over terms of their non-linear supply contracts. Non-linear in the sense that the firm does not charge a single price for all units of output. Rather it applies second degree price discrimination, otherwise known as volume discounts; charging a falling unit price as the volume purchased increases.

The paper finds that forbidding volume discounts by manufacturers (akin to *airports*) renders retailer (akin to *airline*) bargaining power useless and results in more manufacturer market power. This results in:

- all downstream retailers (airlines) paying higher input prices...
- thus, prices for end consumer rise (higher ticket fares), therefore
- large welfare losses are possible.

3.2 Airport-specific literature

There is also a spectrum of airport-specific literature, relating to price discrimination.

Whilst these papers do contain some convincing arguments, due to the often extremely detailed specification of their models, the results are typically much less consistent than the general price discrimination literature. Many of the papers have contradicting end judgements on whether price discrimination is beneficial or harmful to the market, often dependant on their assumed market characteristics that shape their results:

- The shape of the demand curve;
- The costs of the firms (as seen in the theoretical example of the previous section, the downward sloping supply curve created by the high fixed cost, low marginal cost industry was what motivated the results);
- If the airport is congested; and
- If the airport is regulated or not

Haskel, *et al* (2013) find that with airlines in "Cournot competition"⁶, price discrimination by airports results in lower prices and better welfare outcomes as it

⁶ This is a common assumption regarding the way airline competition functions. At any point in time market prices (fares) are largely determined by the interaction between the demand to travel and capacity of seats available on a given route. Airlines have to publish schedules months in advance and so have limited short-run ability to adjust capacity. Under Cournot competition airlines respond to high (or low) fares on a given route by adjusting the capacity they plan to offer in future scheduling periods.

makes the airlines better negotiators. This has a clear direct read-across into the market of global airports, indicating the value of private bilateral contracts and negotiation.

MARKET STRUCTURE, COUNTERVAILING POWER AND PRICE DISCRIMINATION: THE CASE OF AIRPORTS

Haskel et al (2013): This paper studies price discrimination by substitute private airports when airlines and markets are symmetric in a model of Cournot competition at a congested airport (as the baseline). In their model, the incentives to price discriminate arise from the fact that there is bargaining between airports and airlines, so that the possibility of differentiated prices changes the bargaining structure.

Their main result is that price discrimination leads to lower prices as it makes airlines “tougher” negotiators. Downstream companies will bargain less fiercely over price when the benefits of that negotiation are shared with their rivals (as is the case of uniform pricing) and this result is higher charges overall and lower consumer welfare.

The authors find that congestion at an airport changes the strategic interaction between airlines.

- In congested airports, airlines are quantity pre-committed, because they can only operate limited slots (thus they cannot credibly compete in prices since they are unable to put more flights onto clear the market when prices are low).
- By contrast, in uncongested airports, airlines can set price knowing they can vary the quantity of seats if needed; the paper assumes Bertrand competition captures this case

Thus, if there was Cournot competition at a crowded airport, and the airport moved from a uniform to a discriminatory regime, landing fees would fall.

In addition to the benefit of better bargaining power from price discrimination, the literature also provides convincing arguments as to the efficiencies of price discrimination in the airport market.

Biggar (2012) notes that “*price discrimination should be actively encouraged by regulators and policy makers*”, which is contrary to the current policies of many regulators around the world who often hold the contrary view. The author’s arguments rest on the fact that price discrimination may reduce or eliminate deadweight loss, which is beneficial from a welfare perspective.

WHY REGULATE AIRPORTS? A RE-EXAMINATION OF THE RATIONALE FOR AIRPORT REGULATION

Biggar (2012): The authors suggest the primary concern regulators have regarding an airport with market power, is the concern that they will charge a price above marginal cost and consumers will suffer. A welfare loss always occurs when prices exceed marginal costs.

The authors argue however, that price discrimination by a dominant firm may reduce or eliminate any such deadweight loss noting that price discrimination should therefore be actively encouraged by regulators and policy makers.

They outline that economists have argued for many years in favour of congestion pricing in order to ration demand efficiently at those times where demand for a monopoly facility exceeds its capacity.

They find that depending on the shape of the cost curves, rationing demand in this way may allow the service provider to cover its fixed costs while eliminating the deadweight loss.

This efficiency indicates that regulation should promote congestion pricing of airports, yet airport congestion pricing fails to materialise often in reality. Such charging structures are often strongly opposed by Airlines and where congestion pricing has been tried, it is often unwound or scaled back

The authors therefore argue that if airport regulation is primarily about minimisation of deadweight loss, regulators should care primarily about the structure of airport charges not the level:

- If price discrimination is possible, deadweight loss can be reduced to a minimum, and regulators shouldn't be concerned about the level of charges.
- In reality however, regulators often desire "cost-based" charges in airport regulation, which results in too much focus on the level of airport charges rather than the structure and is sub-optimal according to the authors.

In summary, the literature relating to price discrimination, and airport price discrimination specifically, is long-standing and thorough. It is clear that complexities across various functional forms of airport models mean that each case should be evaluated independently, but coherent messages across the literature indicate that price discrimination should not be assumed to be detrimental to consumer interests. Indeed, in most cases it can be assumed to be beneficial from a welfare perspective in airport markets.

Although these theoretical findings are supported by much literature, competition authorities remain apprehensive about the potential anti-trust issues created by price discrimination, and often fail to consider the potential welfare impacts. As a result, *in the past* authorities have taken a cautious view of price discrimination over the last century or so.

However, as will be discussed in the subsequent section, in recent times competition authorities are beginning to take a different, more relaxed view on price discrimination in anti-trust proceedings.

4 COMPETITION AUTHORITIES' APPROACH TO PRICE DISCRIMINATION

While the sections above have focused on price discrimination from a theoretical, and literature perspective, we have not yet touched on the regulatory treatment of price discrimination in real markets. Given that it is possible for so called “losers” to emerge from price discriminatory practices, competition law relating to price discrimination has developed in order to protect from this outcome, while also recognising that competitive markets also produce “losers” and therefore seeking not to over-intervene to impede the normal functioning of markets.

Competition authorities are often active in monitoring pricing strategies of firms to ensure that welfare, specifically that of customers, does not suffer as a result of firms pricing actions in the presence of significant market power. As a form of discriminatory, dynamic pricing, price discrimination has been a focus of these regulators anti-trust assessments for many years due to the potential negative outcomes that can emerge under certain market conditions.

Over time, the judgement passed by these regulators on price discriminatory practices has developed and continues to change as technological revolutions make price discrimination more practicable, for example in online only firms.

In terms of law, the “*Treaty on European Union and the Treaty on the Functioning of the European Union*” that came into force on the 1st January 2009 includes a reference to price discriminatory practices in Article 102, specifically part (c), that EU member states must still adhere to in the present day:



Any abuse by one or more undertakings of a dominant position within the internal market or in a substantial part of it shall be prohibited as incompatible with the internal market in so far as it may affect trade between Member States.

Such abuse may, in particular, consist in:

- (a) directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions;
- (b) limiting production, markets or technical development to the prejudice of consumers;
- (c) applying dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage;
- (d) making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts

— Consolidated Version of the Treaty on European Union C-115/89

In light of the above article, currently European case law distinguishes between two different forms of price discrimination from an anti-trust perspective:

- **Primary line** – price discrimination which results in a vertically integrated dominant firm applying different prices to its own customers, in order to foreclose the dominant company’s own upstream competitors. For example, market squeeze, selective rebates, and the Post Danmark cases (see below).
- **Secondary line** – distortion of downstream competition between the customers of a firm, with injury to at least one. This discrimination occurs when the dominant firm is not active in the market as a competitor (i.e. not vertically integrated). It is to be assumed that airports typically fall into this category rather than primary line, as cases of vertical integration in airports are extremely limited.

Following the above categorisation of price discriminatory practices, in recent years the European Commission has been moving towards a so-called “**effects based**” approach to price discrimination cases. This means that price discrimination itself *alone* is not considered an abuse. Instead, what is assessed as abuse is if the discrimination causes a distortion of competition between the competing downstream parties.

This move towards an effects-based approach is evidenced in the most recent European Commission court judgement relating to price discriminatory practices:

MEO, a Portuguese Pay-TV operator, argued that GDA (a non-profit collecting society managing the rights of artists and performers on an exclusive basis) had applied higher prices to MEO than to their competitor, in breach of Article 102(c).

Below is an extract of the court judgement regarding the case, where the court confirmed that price discrimination is not in itself an abuse of dominance in breach of EU competition case law, in line with the effects bases approach to price discrimination cases:



“Discriminatory pricing can only be an abuse of a dominant position under Article 102(c) TFEU if that conduct causes a ‘competitive disadvantage’ to one of the dominant company’s trading partners. In the case of price discrimination between customers, this requires that such conduct tends to distort competition between those trading partners in the downstream market”

– MEO case judgement C-525/16

Other recent European cases relating to price discriminatory practices are summarised below, and exhibit the aforementioned recent move towards an effects-based approach:

OFGEM POLICY PACKAGES

CMA (2015):

The CMA, found that Ofgem's policy package, which limits price discrimination by energy providers, adversely affected competition '*by reducing retail suppliers' ability and incentives to compete and innovate in designing tariff structures*' and softening competition between PCWs' (price comparison websites).

Outcome: the CMA recommended removing the restrictions on price discrimination (CMA, 2016b, para. 12.356/7)

WHISTL VS ROYAL MAIL

Ofcom (2018):

Ofcom fined Royal Mail for a serious breach of competition law, after the company abused its dominant position by discriminating against its only major competitor delivering letters, Whistl.

Outcome: the conduct was reasonably likely to put other companies at a competitive disadvantage, and restrict competition, and thus Royal Mail was in breach of Article 102

POST DANMARK I & II

EC (2012, 2015):

The Danish incumbent postal service operator:

- was accused of having abused its dominant position for the distribution of unaddressed mail through price discrimination
- i.e., by having charged new customers "*rates different from those it charged its own pre-existing customers without being able to justify those significant differences in its rate and rebate conditions by considerations relating to its costs*"

Outcome: In both cases, the EC found that the abuse of dominance effect of price discrimination is abusive only to the extent that it actually distorts competition.

5 RELEVANT AIRPORT CHARACTERISTICS

In general, the academic literature on price discrimination is generic, rather than relating to any specific sector.

In simple terms the situation considered, is one of an upstream supplier of services to downstream companies. This upstream supplier has high “fixed” and low “variable” costs, and so faces the classic issue of how to recover its overall costs.

The downstream customers are assumed to be varied in their characteristics, but typically buying a homogenous product.

There are clearly similarities between these theoretical constructs and a real airport, but not everything reads across that simply. Before going on to discuss the economics of differentiation in the specific airport context, we start by briefly outlining the key relevant characteristics of airports and their similarity, and difference for the stylised models we have discussed so far.

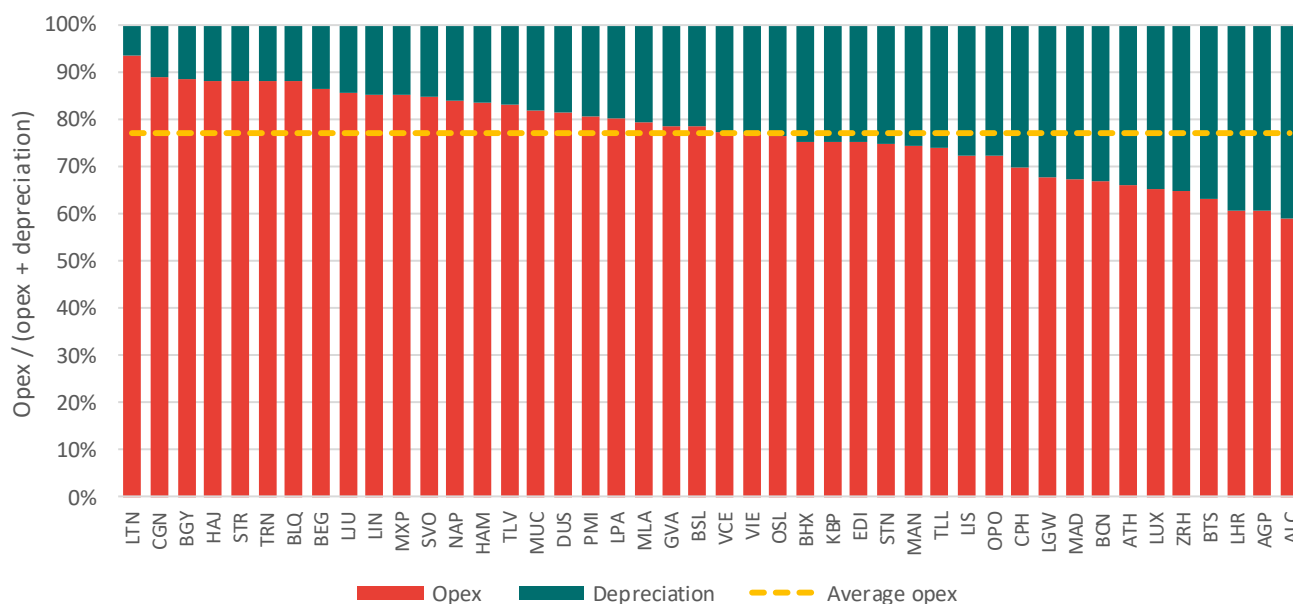
We start by noting that the model most often in mind when economists think about price discrimination is one of the “upstream” provider of infrastructure, such as a power, water telecommunications or postal network. As we have already shown the main cases price discrimination considered by the European Commission and other authorities tend to fall into these categories,

Airports do share some similar characteristics with these networks, but also have some notable differences.

5.1 Cost structure

It is true that airports tend to have relatively high “fixed” and low “variable” costs in the short- to medium term. But there are two other aspects of this characteristic worthy of consideration

First, although airports are clearly capital-intensive businesses and capital investment figures significantly in the cash flow of major airports, the proportion of annual recurrent costs made up of operating costs, as opposed to payments for capital, is quite high. The analysis below shows that for a sample of 44 airports in Europe – based on 2017 data from ATRS – opex as a percentage of opex plus depreciation tends to be in the range of 60%-90%, with the sample average at 77% (see Figure 2 below).

Figure 2 Airports tend to be more opex intensive (ATRS data 2017)

Source: Frontier analysis based on 2017 data from ATRS

Note: This analysis includes data on 44 airports in Europe (all European airports in the ATRS data for which we have data on both opex and depreciation in 2017). We express opex as a percentage of opex + depreciation. The sample average is 77%.

Secondly, the economics literature tends to think about infrastructure operators as “natural monopolies” benefitting from economies of scale across all possible levels of output. While this may be true for airports in the short run, and possibly for very small airports, it is by no means clear that airports, especially more major ones enjoy continuous economies of scale as they expand. Although it is difficult to disentangle other influences such as the cost implications of complexity of traffic mix, it is by no means clear that larger airports have lower unit costs on the long run.

The significance this has for airport pricing in general is that, while airports have an incentive in the short run to “fill up” spare capacity - one of the key drivers of price discrimination in the literature – they will not have an incentive to bind themselves into long-term pricing agreements which do not reflect the costs of future capacity expansion. This means airports are unlikely to be aggressive pursuers of third degree price discrimination, because of the need to finance future expansion in a growing market.

5.2 Airports do not offer a single homogenous product

The theoretical model of third degree price discrimination is one where the upstream service provider is selling a homogenous product to downstream customers with varied characteristics.

While the varied characteristics of customers is certainly true, the homogenous product assumption is not.

Indeed, the aeronautical services offered to airlines are typically made up of a wide range of different services which can be and are offered separately and are consumed in different proportions by different airline customers.

The fact that the activity of an airport can be decomposed into a series of sub-activities is not, of itself, that unusual. What does, however set airports aside from typical “networks” is that these activities can and are separable and customers make choices over which parts of the service to consumer.

By way of example, the provision of potable water requires abstraction, treatment and distribution of water, and all consumers of potable water have to contribute each part of the service. But taking one airport example, separate baggage system charges can focus the cost of baggage handling infrastructure on those passengers who choose to check bags and incentivise more economically efficient use of that part of the airport infrastructure.

We explore the extent of this unbundling in the following section. What is important to note, however, for airport charging, is that a very significant part of what may appear to be price discrimination between airlines is, in fact, the offering of distinctly different bundles of services to different airlines with varied and diverse requirements.

By way of illustration, the figure below is a screenshot from Frankfurt Airport’s published airport charges focussing on its aircraft parking charges. It shows a very granular approach to charging with the charge being split out into (i) 9 different aircraft stand sizes; (ii) two separate times of day (6am to midnight; and midnight to 6am); and (iii) a fixed element and a variable element depending on the number of hours of parking.

Figure 3 Frankfurt Airport parking charges

in €		
von 00:00 bis 23:59 Uhr Ortszeit		
from 00:00 until 23:59 hrs local time		
Positionsgruppe 1	bis zu 10 Stunden	10,29
Aircraft stand size 1	up to 10 hours	
	ab der 11. Stunde bis 24 Stunden (maximaler Tagessatz)	102,90
	> 10 hours up to 24 hours (max. daily rate)	
	je weitere angefangene 24 Stunden (Tagespauschale)	102,90
	> 24 hours per 24 hours or portion thereof (lump-sum daily rate)	
von 06:00 bis 21:59 Uhr Ortszeit		
from 06:00 until 21:59 hrs local time		
Positionsgruppe 2	bis zu 2 Stunden	23,67
Aircraft stand size 2	up to 2 hours	
Positionsgruppe 3	bis zu 3 Stunden	32,93
Aircraft stand size 3	up to 3 hours	
Positionsgruppe 4	bis zu 4 Stunden	44,24
Aircraft stand size 4	up to 4 hours	
Positionsgruppe 5	bis zu 5 Stunden	47,33
Aircraft stand size 5	up to 5 hours	
Positionsgruppe 6	bis zu 5 Stunden	51,45
Aircraft stand size 6	up to 5 hours	
Positionsgruppe 7	bis zu 5 Stunden	54,53
Aircraft stand size 7	up to 5 hours	
Positionsgruppe 8	bis zu 5 Stunden	58,65
Aircraft stand size 8	up to 5 hours	
Positionsgruppe 9	bis zu 5 Stunden	61,74
Aircraft stand size 9	up to 5 hours	
von 22:00 bis 05:59 Uhr Ortszeit		
from 22:00 until 05:59 hrs local time		
Positionsgruppe 2		11,83
Aircraft stand size 2		
Positionsgruppe 3		16,46
Aircraft stand size 3		
Positionsgruppe 4		22,12
Aircraft stand size 4		
Positionsgruppe 5		23,67
Aircraft stand size 5		
Positionsgruppe 6		25,72
Aircraft stand size 6		
Positionsgruppe 7		27,27
Aircraft stand size 7		
Positionsgruppe 8		29,32
Aircraft stand size 8		
Positionsgruppe 9		30,87
Aircraft stand size 9		

Source: <https://www.fraport.com/content/fraport/en/business-partner/airlines-cargo/airport-charges.html>

This does not mean that any form of unbundling is axiomatically acceptable from an economic or regulatory point of view. But it is essential to note that a large part of what appears to be price differentiation at airports is the offering of different product bundles, which is specifically not the subject of the economics literature on price discrimination, which relates to charging different amounts to different customers for the *same* service.

We return to unbundling of airport charges below.

5.3 Serving many different markets

In the theoretical literature it is usually that downstream customers of the service provider have different demand characteristics. The literature is often silent as to why that is, because that is a specific matter that arises when you move from a theoretical model to a real-world example.

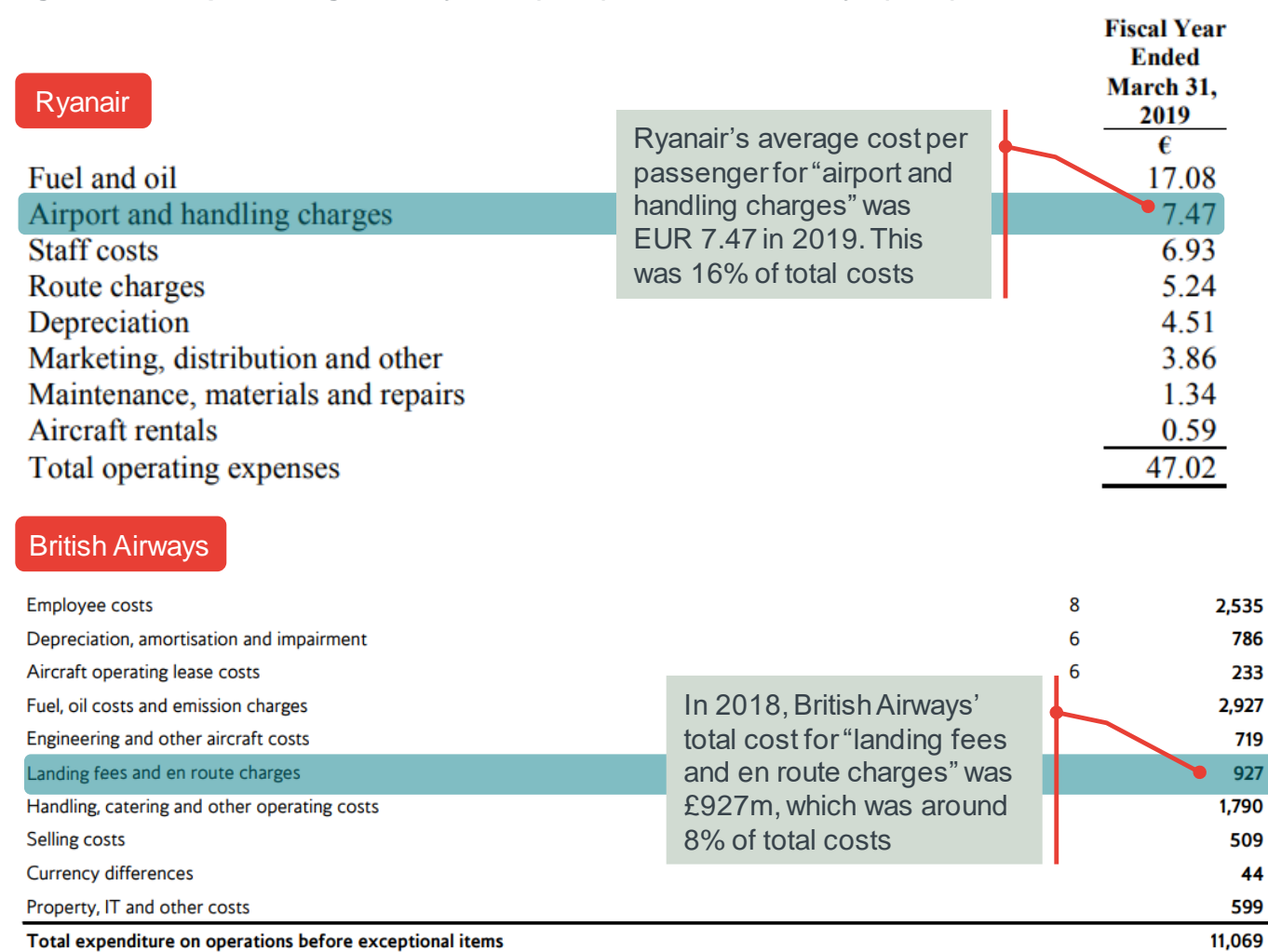
In the case of airports, airline demand varies on two primary dimensions:

- Airline operating model (e.g. full service, vs. low cost, point-to-point vs hub and spoke) which explains many of the differences in the bundle of services required by different airlines, as touched on in the previous section.
- Provision of services in very different downstream markets. This explains why airline willingness to pay for different airport services may not only vary *between* airlines but also for any given airline, depending on the different services the airline is seeking to offer.

This latter point provides, along with disaggregation, the key driver of differentiation in airport charges.

Specifically, what we are talking about here is that the different routes which the airlines operate by and large constitute separate economic markets and the demand conditions in these markets will vary from each other and over time. Sometimes significantly. Variations in these demand conditions have a material bearing on the airline's willingness to pay for airport services *for a given route*.

To give some specific examples: a long-haul full service carrier may be significantly less price sensitive to variations in airport charges on its services than a low cost carrier offering short haul point to point services, both because airport charges make up a much smaller proportion of its costs to operate a route than that of the low cost carrier and because its passengers may also have a lower price elasticity of demand.

Figure 4 Airport charges for Ryanair (2019) and British Airways (2018) as a share of total costs

Source: Frontier analysis based on financial statements. Ryanair: <https://investor.ryanair.com/wp-content/uploads/2019/07/Ryanair-2019-Annual-Report.pdf> BA: <https://www.iairgroup.com/~media/Files/I/IAG/annual-reports/ba/en/british-airways-plc-annual-report-and-accounts-2018.pdf>

Note: This is not exactly a like for like comparison as Ryanair's figure appears to include airport charges plus ground handling charge, whereas BA's figure appears to include airport charges plus en route (air traffic control) charges. However, in both instances, based on our experience, we understand that airport charges are likely to represent the vast majority.

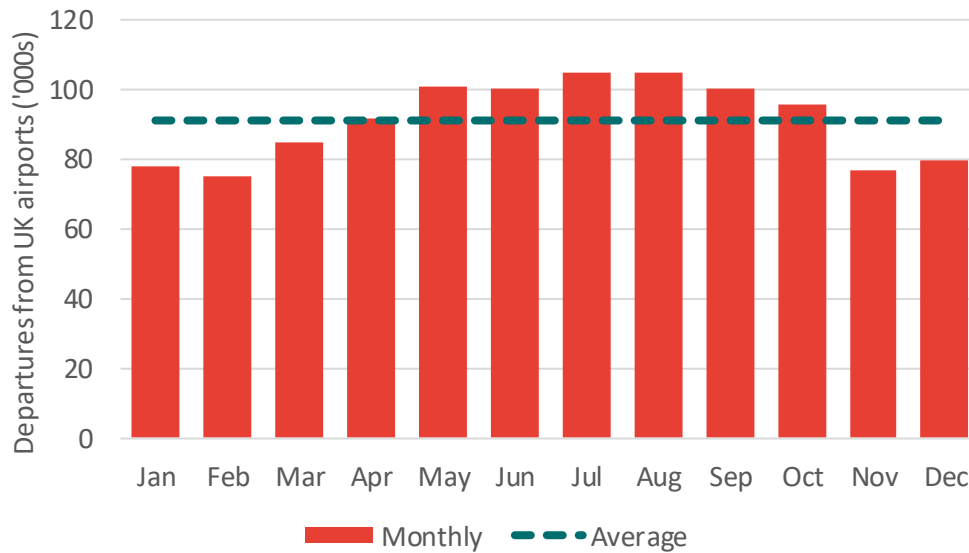
Furthermore, airlines are likely to be significantly more price sensitive when it comes to the starting of new routes, compared to well established ones, because of the greater uncertainty and higher marketing costs inherent in establishing flights to new destinations. For this reason, services which are operationally similar, from the point of view of the airport, may nevertheless be subject to very different market conditions which may lead the airport to differentiate charges for new routes compared to existing ones.

Time of day / time of year will also factor onto airline willingness to pay, as a direct reflection of passenger price sensitivity, which is likely to be lower in periods of peak demand, e.g. early morning and peak holiday-season flights. These demand conditions on otherwise operationally similar flights may also provide reason for airports to differentiate charges.

By way of illustration, the chart below shows the total number of departures by month from all UK airports in 2019. It shows a peak in the summer months, and

lower demand in the winter months. We typically see a similar pattern across the rest of Europe.

Figure 5 Number of departures from UK airport in 2019



Source: Frontier analysis based on 2019 OAG data

5.4 Limited vertical issues

One final issue to raise at this point relates to the likelihood of vertical integration issues at airports.

Another key reason why price discrimination in networks is of particular interest to academics and competition authorities is the possibility of price discrimination between downstream customers resulting in vertical restraints if the upstream provider is also active in the downstream market.

This situation is quite common in network services. Especially those that were once state-owned but have been privatised and progressively unbundled. An obvious, example is fixed-line telephony providers, where the once-nationalised incumbent provider often provides the bulk of the backbone infrastructure for telephony and broadband services *and* is also an active participant in the liberalised retail market for these services. In these cases, there is a risk that the upstream provider may discriminate in favour of its subsidiary to skew the process of downstream competition in its favour.

In airports, and specifically aeronautical services, this is less of an issue. There is little or no vertical integration between airports and airlines within Europe (and only a few isolated examples around the world, although even this is more often via common State ownership rather than direct common ownership and management). Within airports, ground handling has also largely been unbundled and is covered by a separate EU Directive,

For this reason, concerns that price discrimination may be used to deliberately distort the terms of downstream (in this case inter-airline) competition are less serious than they might be in other sectors.

Because airports are fully unbundled from airlines, the typical concern of European competition work is not an issue. One important characteristic is that airlines set airfares using dynamic yield management or load factor management techniques. This means that the airport charge is largely passed through to the customer. Consultation on airport charges between the airport operator and airlines means that airlines aggregate the interests of millions of individual consumers and bargain on their behalf with the airport, driving efficiency and cost.

6 AERONAUTICAL CHARGING IN PRACTICE

In this section we expand on the themes of the previous section to discuss the issue of how airports set aeronautical charges and how that relates to the literature on price discrimination.

We have already noted that aeronautical services (even excluding ground handling) are made up of multiple different sub-services, which can be consumed in differing proportions by airline customers and can, in some cases, be unbundled from the point of view of setting charges.

Unbundling has benefits from an economic efficiency point of view because it allows the airport to send signals to its customers that more accurately reflect the costs which they are imposing on the airport, which in turn allows the airlines to react to these price signals to make more efficient use of the airport infrastructure. Naturally, there is a limit to where unbundling of charges is efficient, and in some cases, especially around capacity constrained airports, more aggregation of charges may be optimal.

Airports subject to the Directive have a requirement to consult their users over their schedule of charges, providing sufficient information to justify their proposals, which, under the terms of the Directive, require objective justification. This justification is often presumed to mean cost-based, but the definition is not necessarily restricted to this. For instance, airports can introduce graded landing charges based on the noise characteristics of aircraft, to encourage the reduction the noise impact on the surrounding communities by discouraging the use of noisier aircraft. This is an “objective justification” even though the noise profile of aircraft does not directly impinge on the costs of the airport itself.

Consultation over charges brings its own difficulties for airports, because while the airport is attempting to determine a schedule of charges that is in the broad interest of its users (because this is likely to be in the airport’s long-term commercial interest), each individual airline is inevitably viewing the charges schedule through the restricted lens of its own financial and competitive interests. As a result, it is understandable that airlines sometimes behave strategically.

Taking noise charges as an example, an airport may have a legitimate objective to encourage quieter aircraft. But if one of its major carriers is operating with less quiet aircraft, or rather, if it has a rival operating newer, quieter, aircraft, it may resist the move to graded noise charges for purely private commercial interests. The broad objective of reducing the overall noise impact of the airport may be socially beneficial, but consultation amongst users can sometimes obstruct such changes, resulting in lowest-common denominator outcomes.

Later in this section we will turn to the role bilateral agreements play in way airports interact with their airline customers. In particular we will draw attention to the bespoke nature of airline requirements and the difficulties airports face in meeting these requirements within the constraints of public consultation.

6.1 What sort of differentiation do airports engage in?

We start by briefly characterising the ways in which airports tend to unbundle their charges and the motivations for doing so. It will become clear as we do this that this “unbundling” sometimes fits within the definition of “price discrimination” as described in the economics literature, but more often than not amounts to efforts to design a structure of charges that reflects the costs the airport incurs, and the costs airlines and different modes of airline operation impose on the airport.

We will summarise the categories here before exploring each in more detail below.

- **Unbundling.** This is a process of disaggregating the sub-services offered by the airport, to make sure, as far as possible, that airlines face charges that reflect the costs they impose on the airport. Insofar as different airlines make different use of these services, the net effect will be that the average aeronautical charge paid by different airlines will vary. But this is a consequence of the fact that they are each consuming a different bundle of services.

A routine example of this is the distinction between runway charges (per aircraft movement) and passenger charges (typically per departing passenger). These charges reflect different drivers of airport infrastructure costs

- **Peak pricing.** Demand at the airport varies by time of day and time of year, and runway and terminal capacity has to be designed to meet the peaks. Inevitably this means at most airports there will be more spare capacity at “off peak” times. Airports may structure landing charges in such a way to reflect this pattern. We discuss the rationale and implications of this below.
- **Volume discounts.** With high fixed costs and lower variable costs, airports, especially those with significant spare capacity, commonly offer volume discounts to airlines, reflecting the fact that offering a higher volume of services spreads the fixed costs of airport operation across a larger customer base, reducing average costs to all.
- **New route incentives.** Airports commonly offer discounts from their standard charges for new routes (or other financial support). This is the first category that starts to resemble price “discrimination” in the literature, because it means in effect that the airport is offering a different price for what is functionally the same service, the difference being the *destination* of the flight, not anything at the airport itself. We outline below the commercial rationale for this pricing behaviour.

6.1.1 Unbundling

This is far and away the most significant way in which differentiation of charges between airlines is introduced into airports.

The twin purposes of unbundling are to permit aeronautical charges to better align to the cost drivers of the airport, but also to induce airlines to make more efficient use of scarce airport capacity by inducing them to react to the costs they impose on the airport.

Basic unbundling

The most common form of unbundling, that we observe at most airports is by the separation of aeronautical charges into aircraft landing fees, aircraft parking charges and departing passenger charges.

The logic of this structure is very straightforward:

- Runway, terminal ATC and apron capacity costs are incurred by aircraft movements, and so recovered via a charge for aircraft movements;
- Parking charges encourage the airline to recognise the cost imposed on the airport by leaving an aircraft on stand and thereby depriving another airline of the opportunity to use that capacity; and
- Terminal-related costs are largely driven by passenger numbers, and hence costs for infrastructure, security, baggage handling, etc., are largely recovered on a per-passenger basis.

This disaggregation already means that airlines with different business models and different traffic mixes will pay different average levels of airport charge per passenger. However, the balance of charges may differ between airports depending on where the constraints lie at a particular airport.

Runway and parking charges may also be graded by aircraft size, as a proxy for the different contribution made to driving capacity and maintenance costs. For instance, larger aircraft require a longer runway for take-off. Larger aircraft also simply occupy a greater space when parked (sometimes, depending on the design of the airport, requiring two stands). The traditional factor for weight-based charges is the impact of the aircraft weight on the runway surface and need for resurfacing (as per ICAO principles).

But all these forms of unbundling are not price discrimination in the sense covered in the academic literature. It reflects airlines buying different bundles of services for the airport, and, assuming the tariffs are set appropriately, reflects the different costs they impose on the airport.

This form of cost-related charging should also be viewed as pro-competitive, in that it ensures, as far as is practicable, that airlines bear the true cost they impose on the infrastructure. But average charges should vary within a particular market segment in ways that are also to be encouraged: for instance, a short haul carrier that achieves faster turnaround times and higher load factors with the same aircraft can make savings on parking charges and will incur a lower runway charge per passenger, which reflects their greater efficiency of use of airport infrastructure.

Even at this simple level of disaggregation it is possible to see how airline self-interest leads to debates and issues about the level and structure of airport charges resulting from consultation and airlines may have a private incentive to resist (or promote) a change to charging structure regardless of whether the change acts in the greater interest. For instance, IATA, the international airline trade body that mostly represents legacy full-service carriers, has long lobbied for an increasing share of passenger-related elements in overall airport charges, while low cost carriers favour more movement-related charges. In reality these are not debates over the costs structure and cost drivers of airports, but rather represent direct self-

interest. Low cost carriers with shorter aircraft turnaround times and higher load factors can reduce the share of airport costs they pay for (for a given volume of traffic) if airport charges are slanted towards aircraft movements and parking. On the other hand, full service carriers, whose business model makes it harder to achieve LCC load factors or turnaround times, can reduce the share of total costs they have to pay for if the proportion of passenger-related charges is higher.

The figure below presents an illustrative example:

Figure 6 Illustrative example

	Airline A Network carrier	Airline B Low cost carrier
Aircraft model	A321	A321
Seats	177	230
Load factor	80%	95%
Passengers	142	219
Turnaround time (mins)	150	40
Passenger charge (per passenger)		£5
Landing charge (per landing)		£500
Parking charge (per 15 mins)		£75
Total charge	£1,960	£1,820
Average per passenger	£13.80	£8.31

Determining the correct cost-reflective balance of charges is beyond the scope of this paper. What is clear, however, is the process of consulting airlines on the mix of charges is not a process likely reveal the correct answer.

Greater levels of unbundling

What we have described above is something like the “vanilla” form of unbundling for airport charges. Most airports, of whatever size will have some variants of the landing/passenger charge combination.

But further, more complex forms of unbundling are also possible. And arguably desirable, if the objective is to induce the airline (and its passengers) to make efficient, cost-reflective decisions, based on the impact that their operations have on the airport and the surrounding communities.

Here are a few examples, which we will not go into in great detail

For aircraft / movement-related charges:

- **Stands.** Airport can levy different charges for contact (on-terminal stands) and non-contact ones (elsewhere on the apron, requiring busing). This reflects the scarcer nature of contact stands. Some airlines, less focussed on fast turn arounds, may benefit from the saving from being able to use non-contact stands.
- **Air bridges.** Although many contact stands may be equipped with an airbridge, most LCCs will prefer not to use them (if the design of the terminal building permits, to speed loading and unloading of passengers by being able to use front and rear steps. Although the airbridge is present, the airport can consider

levying a separate charge for its use. This has the advantage that some airlines can avoid paying for facilities they don't require. And it can send a signal to the airport itself about the need for more airbridges if the airport comes to expand if those bridges largely remain unused. The figure below is a screenshot from Dublin Airport's published charges which includes an airbridge charge:

Figure 7 Dublin Airport has an airbridge charge

3.3. Airbridge Charge

Charging basis	Per 15 minutes or part thereof
Charge level (€)	7.35

- Airbridge charges will be applied to all airbridge-compatible aircraft occupying an airbridge-served stand whether or not the airbridge is used. The billed period for airbridge charging purposes will be the same as that used for aircraft parking charges i.e. it applies from the actual time of arrival (landed time) to the actual time of departure (airborne time) minus 30 minutes as recorded in the AOS database or will be based on actual on/off block times recorded (per 15 minutes or part thereof) on full implementation of AVD.
- A QRF aircraft that uses an airbridge will incur airbridge charges payable at standard rates.
- Airbridge charges will not apply during night-time.
- Charges will not apply if an airbridge is out of service.
- On specific stands, it may be possible to use two airbridges to certain widebody aircraft but not all. Where two airbridges are used in unison to an airbridge-compatible aircraft, the charge applied will be the same as if only one is used.

Source: https://www.dublinairport.com/docs/default-source/airport-charges/airport-charges-2020-including-terms-and-conditions.pdf?sfvrsn=c4e3180a_2

For passenger-related charges:

- **Baggage handling.** The airport incurs a direct cost relating to baggage handling systems within the terminal building (before bags passed to ground handlers), carousels, etc. Whether these costs are relevant or incurred depends on whether the passenger themselves checks luggage. So, unbundling the passenger terminal charge to create a separate bag charge. Airlines can save under this arrangement if their passengers have fewer checked bags on average and therefore impose lower costs on the airport.
- **Check-in desks & bag drops vs. self-service kiosks.** When check in capacity is scarce, it can be in the interest of the airport to unbundle charges for check in desks. Or if they already exist, restructure them to induce airlines to use this capacity efficiently for the shortest necessary time. The provision of self-service kiosks for a separate relevant cost also induces airlines to take up newer more costs and space-efficient technology, which can benefit in terms of reducing the costs of future airport expansion. Figure 8 below is a screenshot from Budapest Airport's published charges which includes a baggage charge:

Figure 8 Budapest Airport has a baggage charge**2.5 Charge for baggage handling system**

Budapest Airport Zrt. will collect the following baggage handling system charge from airport users for the use of the T2 baggage handling system:

Fixed fee:	EUR 27.69 / departure movement
Variable fee:	EUR 0.77 / checked-in baggage

Source: https://www.bud.hu/file/documents/0/0951/tariff_manual_04_2014.pdf

6.1.2 Peak pricing

Some airports, especially larger ones, experience congestion at certain “peak” times of day or year. Congestion means that the demand for runway slots for take-off and landing) exceeds the available supply during those peak periods.

Some airports have responded to this by introducing differential landing charges.

There are two potential objective justifications for this approach, one cost-based, one demand-based.

Cost-based rationale for peak pricing

The cost-based rationale for introducing peak pricing is based on the (reasonable) assumption that airport capacity is driven by the desire to accommodate the busiest periods, and hence use of the airport during these periods should bear the cost of this capacity that it imposes on the airport.

In its most extreme form it could be argued that all costs related to capacity, as opposed to operation, should be borne by flights operating at those times. “off peaks” flights should meet the relevant cost of operations but make no contribution to capacity itself.

The immediate issue with this approach is that there is no unique definition of “peak time”. If the principle were applied literally, it could be argued the busiest 5-minute slot window of the year should bear all capacity costs. The outcome of this approach is obvious, however: airlines would decline slots in that 5-minute window and nobody would contribute to capacity costs. So, a longer peak period needs to be defined, which airlines cannot readily avoid, in order to ensure airlines actually pay the peak charge.

Figure 9 below is a screenshot from Dublin Airport’s airport charges which includes peak pricing. Landing charges are lower during the winter airline scheduling season.

Figure 9 Dublin Airport has summer / winter pricing**3. Airport Charges for Dublin Airport****3.1. Runway Landing and Take-off Charges**

Period	Summer Airline Scheduling Season	Winter Airline Scheduling Season
Charging Basis	Per tonne MTOW or part thereof	Per tonne MTOW or part thereof
Standard charge per ATM Band 1 - 0—175 tonnes (€) (Each way)	5.50	2.15
Standard charge per ATM Band 2 - 176 and over tonnes (€) (Each way)	2.00	1.00

Source: https://www.dublinairport.com/docs/default-source/airport-charges/airport-charges-2020-including-terms-and-conditions.pdf?sfvrsn=c4e3180a_2

Demand-based rationale for peak pricing

The demand-based rationale for peak pricing is that by raising the cost of using capacity at peak times, some airlines will switch capacity away from the peaks. This should result in future savings as the need to expand capacity further to meet peaks will be reduced or relieved altogether.

Airlines sometimes object to this argument by citing operational inflexibilities: either they cannot move their services away from peak times and achieve profitable use of their aircraft, or passengers demand services at those times.

It is not clear however, that these arguments are particularly strong from the economic point of view, because talk of “inflexibility” is equivalent to recognition that demand elasticities are lower at peaks than at other times. Economic theory (and the literature discussed above) generally points in favour of recovering fixed costs more from those less price sensitive market segments, as airlines know very well from their own ticket-pricing policies.

Overall, one can see that the demand- and cost-based rationales can be seen as achieving much the same result and may imply similar pricing approaches (for instance, under the demand-based approach the “efficient” peak charge would still reflect the present value of savings (i.e. costs avoided) as a result of expansion deferred or made unnecessary by shifting traffic.

6.1.3 Volume discounts

Many airports – especially those with significant spare capacity – also offer volume discounts. The size and structure of the discounts vary from airport to airport; however, the general approach is that airlines that grow volumes faster than a target set by the airport receive a discount to their airport charges.

The text box below summarises the volume discount applied at Toulouse Airport.

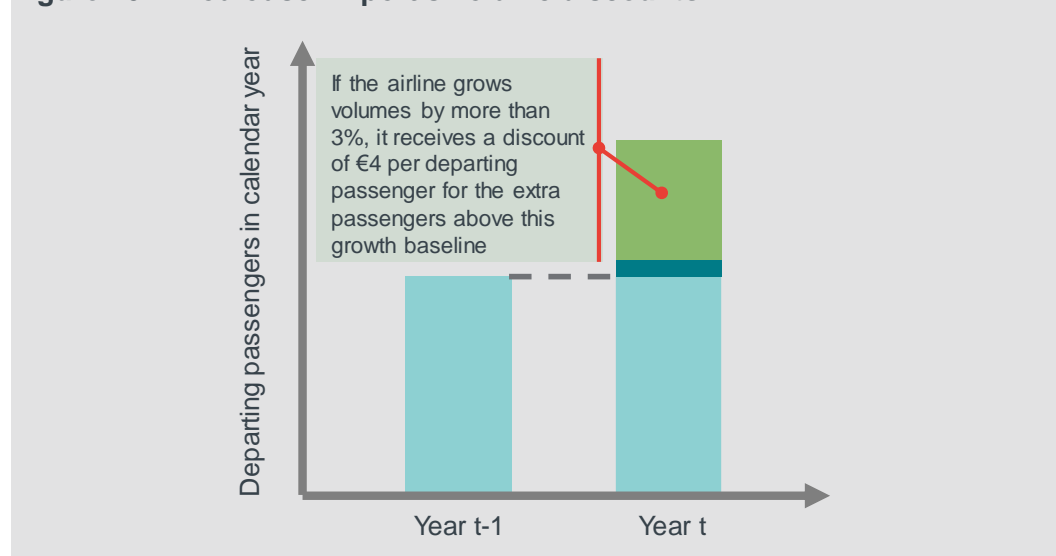
VOLUME DISCOUNTS AT TOULOUSE AIRPORT

The details of the volume discount at Toulouse Airport⁷ are as follows:

- Airlines receive a discount if its growth in the number of departing local passengers at the airport grows by more than 3% compared to the level in the previous calendar year.
- The discount is €4 per departing passenger, applied only to the incremental passengers above the 3% target.
- To put this discount into perspective, the airport's default passenger charge (pre-discount) (in effect since April 2019) ranges from €5.99 per departing passenger for passengers departing to destinations in the Schengen area, to €11.61 per departing passenger for passengers departing to destinations outside of the EU (excluding the Schengen area and French overseas departments and territories). This means that for incremental passengers above the 3% growth target, the discount equates to a 34%-67% discount to the departing passenger charge.
- The discount is only applied to airlines operating scheduled flights with quarterly traffic of at least 3,000 passengers. The discount is also only applied to passenger volumes on existing routes. (In the next section, we discuss Toulouse Airport's new route incentive).

An illustration of the discount is set out below.

Figure 10 Toulouse Airport's volume discounts



Such discounts incentivise airlines to increase volumes at the airport by reducing their overall airport charges. We note that that, unlike new route incentives, which are discussed below, the discount cannot be directly attributed or allocated to a specific group of passengers or to specific routes, but rather it is applied to an airline's overall traffic at the airport (even if the discount is applied to just the incremental passengers above a baseline as this is not a distinct group of passengers). The incentive therefore effectively represents a reduction in the fixed cost of operating at the airport, as opposed to reducing direct costs on a particular route.

⁷ http://www.toulouse.aeroport.fr/sites/default/files/contrib/societe/lasociete/tarifs/redevances_a-2019-en.pdf

Such discounts are non-discriminatory insofar as they are available to all airlines that qualify for them. Of the theoretical examples of price discrimination, this amounts to second degree price discrimination, whereby prices vary based on the number of units sold, but not across consumers: each pays the same for a given volume.

For airports with spare capacity, the incremental cost of handling extra volumes is likely to be relatively low. This has the effect of reducing average costs as volumes increase, and also increasing non-aeronautical revenue. Increasing traffic therefore creates a benefit to all users, but there is a question as to how this benefit is shared. In the medium run, the benefit is likely to be passed through to all airlines in the form of lower airport charges. However, in the short run, the benefit is (at least partially) passed through to the airline that is driving this growth – i.e. the airline that triggers the volume discount pays lower airport charges – and the incentive typically only applies for short period of time anyway. In this respect, the discount can be considered cost reflective. And as mentioned above, such an incentive is available to all airlines that beat the growth target.

6.1.4 New route incentives

As outlined above, airports routinely operate “incentive” schemes to airlines to operate new routes.

These usually take the form of time-limited discounts (usually tapering over time) to aeronautical charges or alternatively “marketing support” in which the airport makes a financial contribution to the airline’s costs of marketing the new route to passengers.

These incentives are usually dependent on the route meeting specific criteria, to ensure the route is genuinely new and to ensure the route is not simply cannibalising traffic from another existing route.

Incentives of this type represent a form of price discrimination, in that identical aircraft landing at an identical time with the same number of passengers on board will be charged a different price depending on whether the aircraft is or is not serving a “new” route. So, it is correct to think that, from the airport’s point of view, such pricing is not cost-related. Unless a long-term cost and assumption that new route will have underlying economics justified.

Nevertheless, such pricing is common place. It is easy to see that it represents a rational pricing strategy for the airport to grow its business and spread its fixed costs across a wider range of services.

The key to understanding why the economics of new and existing routes vary is down to the greater traffic uncertainty airlines face when planning new routes.

For an established route, an airline will have a degree of certainty over the volume of traffic it expects to carry and the yield (average revenue per passenger) it expects to achieve. Undoubtedly there are risks: competitive entry may affect yields. Economic conditions may change in ways that affect demand and costs (e.g. fuel price shocks). And other events may impact on demand (e.g. terrorist attacks, global health scares, ash clouds, etc.), but nevertheless past experience will provide a guide to likely demand and yields.

By contrast new routes enjoy much less certainty for the simple fact that they have not previously been operated. It is intrinsic to the nature of a new route that the airline will be uncertain as to the demand it will generate (or more accurately the yield it will be able to recover to fill the capacity it puts on the route). With route profitability intrinsically less certain, the airline will be more risk averse about operating a new route than an existing one. This translates into a greater price-sensitivity with regard to all costs, including airport charges, than applies to existing routes.

Faced with this situation it is in the airport's commercial interest to set lower for new routes on which airlines will tend to be more price sensitive than for existing ones where they will tend to be relatively less price sensitive. In effect it is in the airport's interest to share the risk of developing new routes with its airline customers. The net effect of this sort of pricing is likely to be more routes offered and greater volumes of traffic, leading to lower average charges overall, than if the airport applied uniform charges to new and existing routes alike.

Figure 11 below is a screenshot from Toulouse Airport's published charges. This includes a new route incentive, whereby airlines on qualifying routes receive a discount on the passenger charge and the landing charge – there are various terms and conditions.

Figure 11 Toulouse Airport's new route incentive

3.1.1 - DEFINITION OF THE ADJUSTMENT

The adjustment of charges for the launch of a new route is applied for the creation of a direct regular flight from Toulouse-Blagnac Airport to an airport that has not been served for more than 6 months.

The rate reduction on the passenger charge and the landing charge is progressively decreased over a period of three years:

Year	Route < 3,000 km	Route ≥ 3,000 km
first year	70%	75%
second year	50%	50%
third year	30%	25%

Source: http://www.toulouse.aeroport.fr/sites/default/files/contrib/societe/lasociete/tarifs/redevances_a-2019-en.pdf

6.2 The limitations of published schedules and the role of bilateral agreements

While all airports publish charging schedules, and for larger airports these schedules are covered by the European Airport Charging Directive, nevertheless in many cases airlines and airports seek to strike bilateral agreements, which are also routinely treated as highly confidential.

Some airports function almost entirely on private bilateral agreements, for instance Gatwick and London City Airport, while others, including major and heavily congested airports, tend to function almost exclusively off a published tariff schedule.

In addition, certain small to medium-sized airports sometimes have bilateral agreements with major carriers based at their airport, covering a range of commercial issues.

Before continuing with this topic, it must be noted that private and confidential bilateral contracts between upstream and downstream suppliers are commonplace in business situations.

Where downstream companies rely on an upstream supplier for a vital input into its production, it is routine for it to want to contract formally for that input to ensure continuity of supply, quality of service, and terms of compensation for circumstances in which the upstream supplier fails to meet its obligations.

Similarly, upstream suppliers get significant benefit from the certainty provided by agreeing long term supply to a major customer, because this enhances its ability to invest in productive capacity and to finance the cost of that investment.

The business prospects of upstream and downstream suppliers are also subject largely to the same external drivers of business risks and so have a joint interest in sharing those risks in a mutually beneficial manner.

In this sense, bilateral agreements between airport and airlines are no different in nature to those in any other sector.

We cannot discuss the specific nature of particular deals here, because as in all other sectors, these deals are usually treated as highly confidential. But we can discuss some of the general principles that underlie these deals and explain why airlines and airports cannot simply rely upon published tariffs of charges but rather seek to sign bespoke agreements.

We can identify two key reasons why airlines and airports are interested in entering into bilateral commercial agreements. These are:

- Commitments over time, which share risk and support capacity investment in the airport; and
- The pressures of inter-airline competition.

We discuss each of these topics in turn below.

6.2.1 Commitments over time

One key limitation of published charging schedules is that they apply simply to access to the airport for the relevant charging period, typically one year. As such there is a mismatch between the obligation that the commitment that airport is able to seek from its users in the schedule and the commitments that the airport has to enter into in terms of future capacity provision.

Indeed, airlines sometimes criticise airport charging proposals when they seek to include within the charges the costs of “work in progress” to develop new capacity (sometimes referred to as asset pre-finance). The objection voiced in terms of the airline paying for a capacity that is not currently available and while paid for by current users may be used in future by airlines that have not made similar contributions.

By entering in into longer-term commitments the airport and airline can negotiate more mutually-satisfactory allocations of cost and risk which have benefits on both sides.

By obtaining commitments to future levels of (and growth in) traffic, the airport reduces the risk inherent in capacity development and can sometimes obtain more advantageous finance for its expansion. With greater certainty over future traffic levels it is also possible for the airport to plan staffing and other supplier contracts more effectively.

This creates benefits the airport may be willing to share with the airline able to enter into this sort of commitment. Hence the airline may gain from such commitments by being offered more advantageous terms than could be justified by simply operating on a season-by-season basis on the published schedule.

6.2.2 The pressures of inter-airline competition.

In our literature review, we highlighted the paper by Haskel et al, which focusses on the negotiation power of airlines.

This is very pertinent because the ability of airlines to agree bespoke arrangements with their partner airports is a key way in which they can seek to generate competitive advantage with regard to their airline rivals.

The terms of these agreements are closely guarded secrets precisely because the airlines concerned do not wish to share the benefits of these agreements with their rivals.

Haskel, *et al* point to a theoretical effect which gives airlines greater motivation to negotiate more aggressively with airports. Interacting with the particular bespoke demands that airlines often make on their airports, outlined above, this provides a clear motivation for why airlines seek to enter into such arrangements in highly competitive aviation markets.

We believe Haskel's argument goes to the heart of why confidential bilateral agreements form a central part of competitive airline markets. They allow airlines to strike mutually beneficial agreements with the airport while ensuring that, as far as possible, those benefits are enjoyed by parties to the agreement.

By contrast, published schedules, by their very nature, cannot deliver these same benefits. In fact, published tariff schedules, while appearing to provide some level of protection, in fact run the risk of becoming a lowest-common denominator approach which prevents innovation and stands in the way of airlines coming forward with plans that may benefit both them and the airport. This is because negotiating a public schedule of tariffs with all airport users opens up the process to obstruction from any carrier which is not able to offer mutually beneficial innovations.

7 DATA ANALYSIS: DIFFERENTIATED PRICING DELIVERS POSITIVE CONNECTIVITY OUTCOMES

Ideally, we would be able to test empirically whether the use of bilateral agreements has had a positive impact on the aviation sector. However, bilateral agreements tend to be confidential. We cannot observe whether a particular airport has bilateral agreements with airlines. And even if we could, we cannot observe the terms of those agreements. Therefore, ultimately it is not possible to comprehensively carry out such analysis with a strong degree of confidence or robustness.

However, we believe that there are some parallels between bilateral agreements and published incentive schemes – which are observable. Incentive schemes tend to vary from airport to airport. However, at a high level, they tend to come in the following forms:

- **New route incentives:** As discussed in more detail in Section 6, airports may incentivise airlines to add new routes by offering to discount their airport charges on new routes for a period of time. The size of the discounts and the duration of the discounts tend to vary from airport to airport.
- **Volume discounts:** As discussed in more detail in Section 6, airports may also offer a discount in airport charges to an airline if it commits to increasing capacity and growing passenger volumes at the airport. Whereas new route incentives provide discounts to airport charges on new routes only, volume discounts are often applied across all of the airline's routes at the airport, focussing on the airline's total passenger volumes in aggregate.

There are similarities between these incentives and bilateral agreements. In both instances, the airport is effectively deciding to accept lower aeronautical revenue per passenger in an attempt to incentivise airlines to grow traffic. Also, in practice, volume discounts (and to a lesser extent new route incentives) may only be taken up by a relatively small number of airlines at a given airport, such that in practice they may have the effect of mimicking bilateral agreements. However, we note that published incentive schemes are public knowledge and open to all airlines that qualify for them on the same terms. Whereas for bilateral agreements, the precise terms may vary even between two airlines that have an agreement with the same airport.

Given that we cannot observe bilateral agreements, we have therefore decided to test instead whether there is any evidence to suggest that published incentive schemes have had a positive impact on the sector in terms of growing volumes. As discussed in more detail below, we recognise that there are many factors that drive growth, with airport charges and incentive schemes being just one component in the overall dynamic. The analysis described below is relatively high level, and when presenting our results, we add caveats and limitations accordingly.

Our approach is as follows:

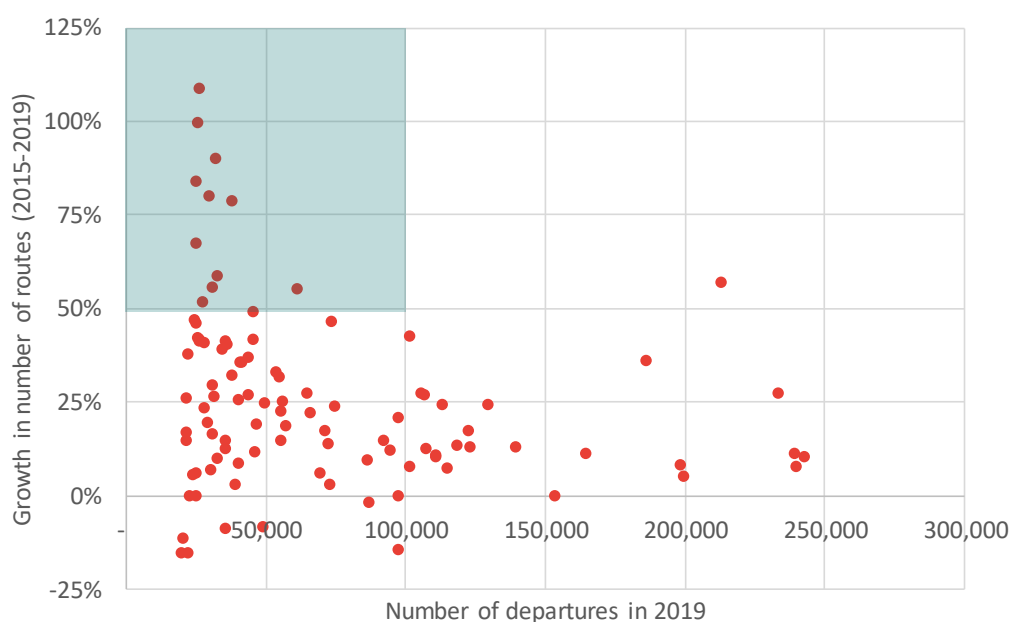
- We have identified the top 100 airports in Europe – measured by the total number of departures in 2019.
- For each airport we have taken a snapshot of total volumes in 2015 and in 2019. Our measures of volumes are:
 - The total number of routes at each airport. In this analysis we define a route at the level of individual destination airports served (as opposed to cities)⁸. Also, to remove the long tail of routes that are served with relatively low frequency, we have applied a frequency threshold to include in our analysis only routes which were served with at least 100 departures in each calendar year.
 - The total number of departures at each airport in question in each calendar year. We consider this measure to be more relevant in the context of volume discounts.

We believe the number of routes is the more relevant measure in the context of new route incentives – i.e. to assess whether new route incentives have led to there being more routes – and the total number of departures is more relevant in the context of volume incentives.

- We have then calculated the growth in both measures over the period 2015-2019.

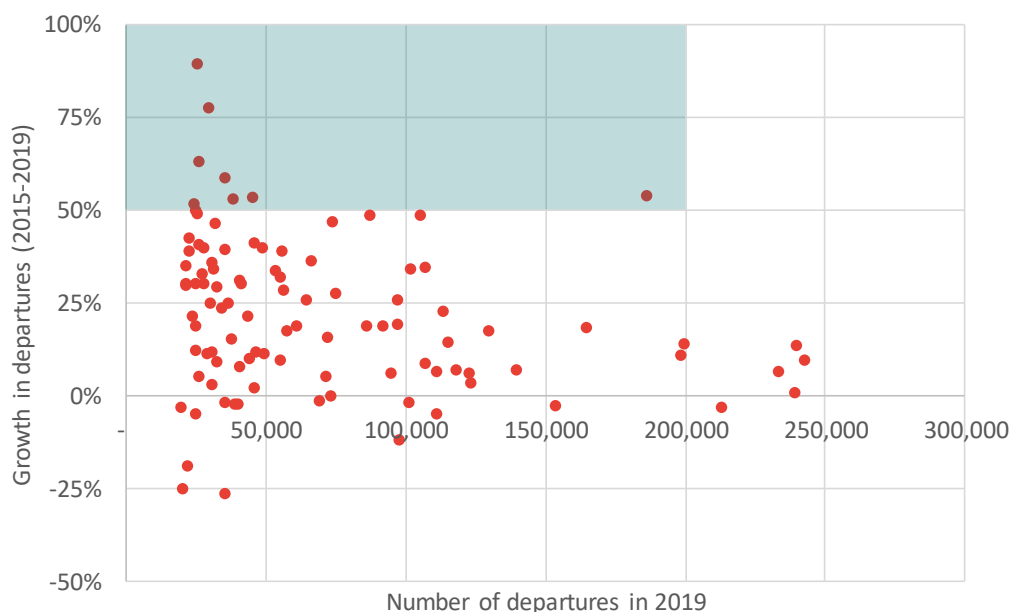
This is shown below:

Figure 12 Growth in the number of routes 2015-2019. Largest 100 airports in Europe



Source: Frontier analysis of OAG data

⁸ For instance, a connection to London Stansted and to London Gatwick would count in this analysis as two separate connections as opposed to one connection to London.

Figure 13 Growth in departures 2015-2019. Largest 100 airports in Europe

Source: Frontier analysis of OAG data

We observe that most of the airports have grown, with some growing faster than others. We have then focussed our analysis on the airports that have experienced greater than 50% growth over the period 2015-2019 either in the number of routes or the total number of departures. (These are the airports that appear in either of the two shaded areas in the charts above. We note that there is some overlap between the two lists – as shown below).

To highlight how much these airports have grown, and to give a sense of scale, we have compared the growths at these airports to two benchmarks:

- The growth in the number of departures and the growth in the number of routes observed at the country-level over the same period; and
- The GDP growth experienced at the country-level over the same period. We note that there tends to be a positive relationship between GDP growth and the demand for air travel.⁹

As shown below, the growth observed at these airports has generally far outstripped the benchmarks.

⁹ Academic studies suggest that income elasticities of demand tend to be in the region of 1-2 – i.e. a 1% increase in income leads to a 1%-2% increase in demand, and that the elasticity tends to fall as countries become richer. <https://www.iata.org/en/iata-repository/publications/economic-reports/estimating-air-travel-demand-elasticities---by-intervistas/>

Figure 14 Fastest growers – number of routes

	Code	Airport	Country	Growth in number of routes 2015-2019	Growth in number of routes at country level 2015-2019	GDP growth at the country level 2015-2019
1	AER	Sochi	Russian	100%	31%	11%
2	BOD	Bordeaux Merignac	France	59%	24%	17%
3	EDI	Edinburgh	UK	55%	13%	17%
4	KRK	Krakow John Paul II - Balice	Poland	80%	29%	24%
5	LUX	Luxembourg	Luxembourg	52%	52%	26%
6	MLA	Malta	Malta	67%	67%	45%
7	NAP	Naples Capodichino	Italy	79%	20%	18%
8	NTE	Nantes Atlantique	France	56%	24%	17%
9	PMO	Palermo	Italy	84%	20%	18%
10	SVQ	Sevilla Airport	Spain	109%	18%	22%
11	VLC	Valencia Airport	Spain	90%	18%	22%

Source: Frontier analysis based on data from OAG Analyser and the World Bank

Figure 15 Fastest growers – number of departures

	Code	Airport	Country	Growth in departures 2015-2019	Growth in departures at country level 2015-2019	GDP growth over period
1	AER	Sochi	Russia	90%	32%	11%
2	KBP	Kiev Borispol	Ukraine	54%	61%	18%
3	KRK	Krakow John Paul II - Balice	Poland	78%	44%	24%
4	MLA	Malta	Malta	50%	50%	45%
5	MSQ	Minsk International	Belarus	52%	51%	2%
6	NAP	Naples Capodichino	Italy	53%	14%	18%
7	SVO	Moscow Sheremetyevo	Russia	54%	32%	11%
8	SVQ	Sevilla Airport	Spain	63%	27%	22%
9	TFN	Tenerife Norte	Spain	59%	27%	22%

Source: Frontier analysis based on data from OAG Analyser and the World Bank

We have then researched these airports to identify whether they have particularly attractive incentive schemes. Our results are shown in the table below.

Figure 16 Published incentives for fastest growing airports

Airport	New route incentive	Volume incentive
Sochi	Reduction in airport charges: 80% in Year 1; 50% in Year 2	50% reduction in airport charges for additional flights relative to the previous year
Kiev Borispol	There is no specific new route incentive, but there is a volume of flights incentive - see (2) of volume incentives.	(1) Passenger charge discount for additional passengers for 3 years starting at 80%.
		(2) Landing charge discount for additional flights (on new or existing routes) for 3 years starting at 80%.
		(3) Passenger charge discount for airlines with a total number of monthly passengers above 5,000. The discount starts at 5% and increases to 55% for airlines with more than 260,000 passengers.
Krakow John Paul II - Balice	Landing charge discount available for new summer / winter routes for the first 5 years. Starts at 55% for the first summer season and 80% for the first winter season, and decreases each year.	Passenger charge discount if the number of annual passengers exceeds 25,000. The discount starts at 2% and goes up to 49% depending on the number of passengers.
Malta	Passenger charge discount available for new summer / winter routes for the first 3 years. Starts at 30% for the first summer season and 40% for the first winter season, and decreases each year.	(1) Passenger charge discount of around 50% for each transfer passenger.
		(2) Passenger charge discount of 25% euro for each non-EU passenger.
Minsk International	Information on airport charges is not publicly available.	
Naples Capodichino	(1) Aerocharge fee discount on new intercontinental long haul flights of 50% in the first year, 40% in the second year and 30% in the third year.	Aerocharge fee discount on existing hub routes during the winter season of 30% in the first year, 25% in the second year and 20% in the third year.
	(2) Aerocharge fee discount on new hub flights of 30% in the first year, 25% in the second year and 20% in the third year.	
Moscow Sheremetyevo International	Information on airport charges is not publicly available.	
Sevilla Airport	Passenger charge discount of 75% in the first year for (i) new routes, and (iii) additional passengers on long-haul existing routes. The discount falls to 25% in the second year.	
Valencia Airport		
Palermo	(1) Discounts of up to 25% for domestic passengers, and 35% for international passengers depending on the airline's total number of passengers. (2) Discounts of up to 25% depending on the total number of routes operated by the airline	
Bordeaux	Reduction in landing charges: 75% in Year 1; 50% in Year 2; 25% in Year 3	Some marketing support
Nantes	Reduction in landing and passenger charges: 80% in Year 1; 70% in Year 2	No evidence
Edinburgh	We understand that EDI used to have published incentives in 2013. In 2014, the published incentives were removed and airlines were invited to contact EDI for discussion.	
Luxembourg	Luxembourg airport does not have a published incentive scheme. However, we understand that it does not have a landing charge, and it only has a passenger charge. In practice, this acts as an incentive to increase frequency because if demand is low (i.e. there are few passengers per flight), airport charges will be also low.	

Source: Frontier analysis of various published charges documents

The results are mixed. As shown in the table above, some of the airports do indeed appear to have strong incentives. However, for others the incentives are less strong. And for others we cannot find any evidence of published incentives. We note that these airports may well have bilateral agreements too, but we cannot observe this.

Also, based on our discussions with ACI EUROPE we understand that most airports in Europe tend to provide incentives – albeit the strength of the incentives varies from airport to airport. Therefore, we cannot say for sure that these airports have grown faster than the others precisely because of their incentive schemes, as most of the other airports in the analysis also have incentive schemes. And indeed, it is plausible that the airports with the strongest incentives might not have experienced high levels of growth. (It was outside the scope of this project to review the published charges and incentives of all of the airports in the analysis – i.e. the largest 100 airports in Europe.)

Therefore, it is not clear whether the growth rates observed above are driven by the airports having attractive incentives, or whether this is driven by other factors. For instance, the high observed growth rates at some airports might simply reflect a recovery following a reduction in traffic after the 2008 financial crisis. Also, it is highly plausible that the large growth rates might have been driven by bilateral agreements, which of course are the main focus of this report, but we cannot observe them.

Our main finding is that while airport charges and published incentives are just one component in the overall airline cost structure, in a sector with low margins airlines should be expected to respond to incentive schemes, and the same is likely even more true in the case of bilateral agreements where discounts may be even larger. By reducing overall costs for airlines and thereby boosting the viability of adding extra capacity, we expect that bilateral agreements do lead to an increase in volumes which is a positive outcome for passengers using those airports. Also, as highlighted above, the airports that have experienced the largest growth rates do have published incentives. Given that traffic and the number of routes at those airports have increased, clearly these incentives must have been taken up / paid out to airlines, implying that they do have a real impact: differentiated airport pricing delivers positive connectivity outcomes.

8 CONCLUSIONS

In this report we have presented a summary of the academic literature on price discrimination and discussed the regime that the European Commission now uses to assess whether cases of price discrimination could have detrimental competition effects.

- **Academic studies tend to confirm that price discrimination improves efficiency and enhances downstream competition**

On the whole, in cases where upstream suppliers have relatively high fixed costs and low marginal costs, such as infrastructure providers, the academic literature tends to support the idea that price discrimination is likely to improve the efficiency of use of upstream infrastructure and intensify the competition in downstream markets.

In particular, it is generally assumed that discrimination that results in more intensive use of the infrastructure will be welfare enhancing overall.

- **Competition authorities are concerned with effects, not discrimination *per se***

We have discussed how competition authorities have come to view issues of price discrimination. Noting that competition authorities are only concerned with cases where significant market power can be demonstrated, their primary concern is not with discrimination *per se*, but rather with the potential for anti-competitive effects.

The application of this literature to airports is an obvious step, because of the nature of airport cost structures. However, it should be noted immediately that the application of the European Airport Charging Directive does not imply that the airports in question automatically have significant market power. Some may, but it is likely that many do not. For instance, in the UK, which as the most well-developed approach to assessing airport market power, only two airports, Heathrow and Gatwick are deemed to have enough market power to require licencing under the relevant Act, while a further 11¹⁰ are subject to the Directive.

- **Regulatory limitations on the ability of airports and airlines to strike mutually beneficial deals goes beyond what would be permitted under competition law**

In this context it the ECJ's decision creates curious precedent. We are not, of course, qualified to comment on the "correctness" of the Decision in law, and note that the Decision does not relate to competition law. But we note that the Decision places limitations on the commercial deals airports can strike with airlines because they are subject to the Directive, even though they have not been established to have significant market power under Community law.

- **Airlines' allegations of price discrimination are usually unfounded; a misrepresentation of price "unbundling"**

Third-degree price discrimination refers to charging customers differential prices for the same product or service. Airport charges are differentiated because the

¹⁰ Manchester, Stansted, Luton, Edinburgh, Birmingham, Glasgow, Bristol, Belfast International, Newcastle, Liverpool and London City.

service provided by the airport is made up of many different sub-services. Airlines make different use of these services, depending on their business model, for instance low cost carriers typically do not make use of air bridges and spend less time with aircraft parked at contact stands than full service or long-haul carriers.

The differentiation engaged in by airports is better understood as “unbundling” of services to ensure a better targeted and more cost-reflective service for airline customers.

■ **Examples of more explicit “differentiation” include new route incentives and volume discounts, which are likely to be beneficial**

The primary area where airports engage in price discrimination in the textbook sense relates to incentives for new routes and volume discounts.

- New route incentives:
 - This pricing behaviour is common across airports of all sizes, provided the airport has spare capacity. Discounts for new routes is a rational commercial strategy that leads to greater use of the airport infrastructure as a whole, and hence spreads airport fixed costs over a wider range of services, reducing average costs. It should, therefore, be expected to be welfare enhancing overall.
 - Moreover, as these incentives are focussed on new routes there is no reason to anticipate anti-competitive effects between carriers occurring as a result of this pricing. Treating individual routes as separate markets (in line with the typical approach of European anti-trust authorities), the fact that the routes are new to the airport means there would not be expected to be other carriers on the same route who could claim to have suffered a disadvantage.
- Volume incentives:
 - This pricing behaviour is also common across many airports in Europe. The size and structure of the discounts vary from airport to airport; however, the general approach is that airlines that grow volumes faster than a target set by the airport receive a discount to their airport charges.
 - For airports with spare capacity, the incremental cost of handling extra volumes is likely to be relatively low. This has the effect of decreasing average costs, and also increasing non-aeronautical revenue, and there is a question as to how this benefit is shared. In the medium run, the benefit is likely to be passed through to all airlines in the form of lower airport charges. However, in the short run, the benefit is (at least partially) passed through to the airline that is driving this growth – i.e. the airline that triggers the volume discount pays lower airport charges. In this respect, the discount can be considered cost reflective. And the incentive is available to all airlines that beat the growth target.
- **Bilateral agreements between airports and airlines reflect the varied and bespoke nature of airline requirements and long-term commitments by airlines.**

Published aeronautical charges apply for a year or a season, and do not readily allow for the possibility of the airline and airport entering into a longer-term commitment. However, there is considerable mutual advantage from this sort of arrangement. By obtaining long-term commitments from based carriers the airport can obtain greater security over future levels of traffic and so can plan and finance future capacity more efficiently, the airline gains by being able to share in this benefit in a way from the standard tariff.

Private bilateral contracts between upstream and downstream suppliers are routine in most sectors and in this context should not be seen as unusual in the context of aviation. Indeed, there are strong reasons to consider that such contracts are a sign of a well-functioning competitive airline market. By being able to negotiate bespoke arrangements, not only do airlines and airports are better able to coordinate the service offered to each individual business model. Furthermore, as is supported by the academic literature, airlines that can retain a greater proportion of the benefits of their innovations are likely to negotiate more fiercely with airports leading to lower aeronautical charges overall.

■ **Analysis of available data shows that differentiated airport pricing delivers positive connectivity outcomes**

Ultimately, it is not possible to assess empirically the impact of bilateral agreements on the sector because the details tend to be confidential. Given that we cannot observe bilateral agreements, we have tested instead whether there is any evidence to suggest that published incentive schemes have had a positive impact. There are parallels between published incentive schemes and bilateral agreements.

We have analysed how traffic volumes and the number of routes at the largest 100 airports in Europe evolved over the period 2015-2019. Of the fastest growing airports, some of the airports do indeed appear to have strong incentives. However, for others the incentives are less strong. And for others we cannot find any evidence of published incentives. We cannot say for sure that these airports have grown faster than the others precisely because of their incentive schemes. And indeed, it is plausible that the airports with the strongest incentives might not have experienced high levels of growth. (It was outside the scope of this project to review the published charges and incentives of all of the airports in the analysis). Also, it is highly plausible that the large growth rates might have been driven by bilateral agreements, which of course are the main focus of this report, but we cannot observe them.

While airport charges and published incentives are just one component in the overall airline cost structure, in a sector with low margins airlines should be expected to respond to incentive schemes, and the same is likely even more true in the case of bilateral agreements where discounts may be even larger. By reducing overall costs for airlines and thereby boosting the viability of adding extra capacity, we expect that bilateral agreements do lead to an increase in volumes which is a positive outcome for passengers using those airports.

