

Q6 review of the distribution of economic rent between airport, airlines and passengers and cargo users at Heathrow and Gatwick

A Report for the CAA by SLG Economics Ltd

September 2013

SLG ECONOMICS LTD
ECONOMICS, REGULATION, COMPETITION

Q6 Review of the distribution of economic rent between airport, airlines and passengers and cargo users at Heathrow and Gatwick

Introduction

The CAA have asked SLG Economics Ltd to undertake a review of the distribution of economic rent between airports, airlines and passenger and cargo users at Heathrow and Gatwick. In particular the CAA would like to explore:

- the theoretical arguments concerning the sharing of rents between the upstream and downstream customers of a monopolist when the monopolist's prices are exogenously increased or reduced.
- the implications, if any, of capacity constraints in the monopolist's business for the sharing of rents referred to in the previous bullet point.
- The implications of capacity at airports in SE England being substantially determined by government policy and the low likelihood of significant increases in capacity in the short or medium term
- the implications, if any, of the existence of the single till form of control in the context of UK regulated airports for the sharing of rents.

Structure of the Market

The air sector has two important market interfaces: between airports and airlines (a wholesale market), and between airlines and passengers (a retail market); and on the cargo side between airports and cargo operators (wholesale market) and between cargo operators and cargo users (retail market) (see Figure 1). The interaction between these two markets can determine how any available economic rent is shared between airports, airlines/cargo operators and passengers/cargo users.

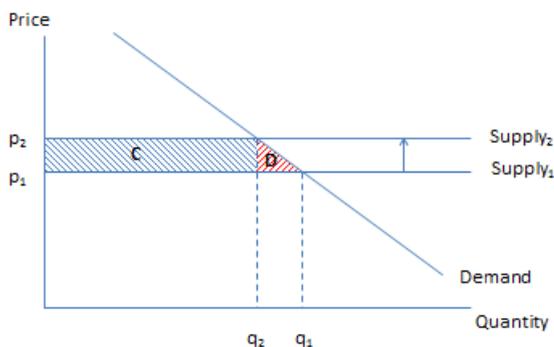
Figure 1: Wholesale and retail markets



The impact of an exogenous rise in airport prices

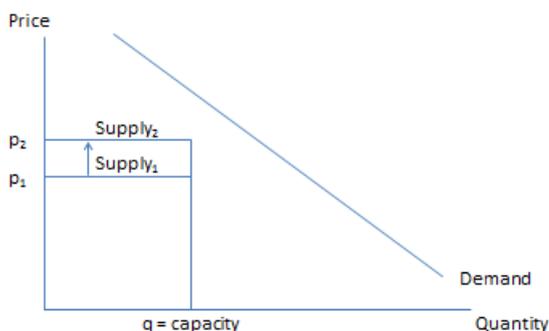
If the monopolist airport’s prices are assumed to be exogenously increased, and the prices are fixed (by the regulator) irrespective of volume sold (i.e. the supply curve is horizontal up to the capacity constraint), then (ignoring any capacity constraints), the price rise is effectively a move along the demand curve – increasing the price and decreasing the quantity (see Figure 2). The change is dependent purely on the shape of the demand curve (the price elasticity of demand) and there is a transfer of consumer surplus to producer surplus (shaded area C) and a loss of consumer surplus (area D: the ‘deadweight loss’).

Figure 2: Exogenous increase in regulated price with no capacity constraint



If however, the regulated price is set at a level such that the market clearing volume is greater than the capacity available, then there is unsatisfied demand - price and quantity are restricted to the regulated price and available capacity respectively (Figure 3). Any increase in the regulated price feeds straight through into a price rise with no change in quantity (since the market clearing quantity is still above the available capacity). This is a straight transfer from consumers to producers.

Figure 3: Regulated price with capacity constraints and unmet demand



While in a ‘normal’ market, the price would rise in reaction to capacity constraints and unmet demand, signalling profitable opportunities either leading to investment in extra capacity by the incumbent or entry by other firms; in the airport sector entry may not be possible (there are very high barriers to entry) and investment in significant capacity either

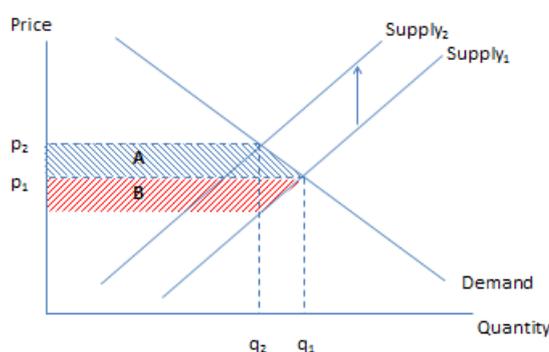
SLG ECONOMICS LTD

ECONOMICS, REGULATION, COMPETITION

by the incumbent or a new entrant is substantially determined by government (and likely only to be achievable in the very long term or may be not at all – see discussion below).

Considering the effects of regulated prices and capacity constraints in the wholesale market on the retail market (and assuming that those retail markets are fairly competitive), then the exogenous rise in the regulated wholesale price feeds through into an upward shift in the supply curve of the airlines (see Figure 4), increasing the price and reducing the quantity supplied compared to the previous equilibrium.

Figure 4: Impact of exogenous wholesale price rise on retail market



The amount that the price and volume shifts (and how the effect is shared between producers and consumers) is dependent on the slopes of the supply and demand curves. The flatter the supply curve the greater the price increase and quantity reduction, while the flatter (and more elastic) the demand curve the less the price rise, but the greater the quantity reduction. In this example the loss of consumer surplus is represented by shaded area A reflecting the higher price and lower quantity consumed, while the loss of producer surplus is represented by shaded area B reflecting the fact that the producer has not been able to pass on all of the cost rise to customers and the lower quantity produced.

The question raised by HAL is whether Heathrow should be allowed to raise prices to fund improvements in service and whether lower prices benefit airlines or passengers. As long as the demand is inelastic then raising prices will raise revenue at the airport (this is in line with the CAA's 'minded to' conclusion that a hypothetical monopolist of Heathrow aeronautical services could profitably raise prices by 5-10% above the competitive level). Whether HAL would be incentivised to spend this extra revenue on investment or not is dependent on the incentive structure in place and outside the scope of this paper; however if the appropriate incentives are in place to reward efficient investment (i.e. investment where the customer willingness to pay is greater than the efficiently incurred cost) and there is easy access to capital markets so that cash flow and financing are not a constraint, then there should be no need for additional revenue from existing customers to 'pre-fund' new investment. Without

SLG ECONOMICS LTD

ECONOMICS, REGULATION, COMPETITION

the appropriate investment incentives in place, there would clearly be a risk that the airport would simply use higher prices to increase profits rather than fund investment.

Following an increase in airport charges, an airline makes a decision either to absorb the cost increase or pass some or all of it onto its passengers and/or switch services to other airports and/or stop operating the services. Should the airline choose to pass some or all of the price rise onto passengers in higher prices, the passengers may decide to switch to an alternative flight (at that airport or a different airport), or not to fly at all. It should be noted that airport charges make up around 30% of Low Cost Carrier airlines cost base¹ and around 10% for long-haul carriers, therefore a 10% rise in airport charges will only be a 1% increase in the costs of a long haul carrier or 3% for an LCC. Therefore unless the airport price rise was very significant it is unlikely that it would prompt the airline to switch to other airports given the sunk costs involved in their existing investments and the one-off costs involved in switching. Similarly given average projected profit margins for airline routes of well over 5%² it is unlikely that it would lead to many routes being stopped (although it is the profitability of the marginal route which is key for this decision).

As shown by the simple analysis above, the extent to which any price rise is passed through to passengers is dependent on the slope of the supply and demand curves in the retail market. The overall impact in the retail air transport market is complicated because it is generally thought of as multiple point-to-point (or city-to-city) flows with only limited substitution opportunities available between the flows³, meaning that one would expect different price and quantity responses for different flows depending on the differing demand conditions and the degree of direct and indirect competition on the specific flow. In the airline market the degree of competition will also be driven by the presence of bilateral agreements between the countries – in some cases directly limiting the opportunity for increased competition (although ‘open skies’ agreements such as between the EU and US remove the majority of restrictions on airlines and while many of the more important international markets from the UK remain subject to old-style Air Services Agreements, the constraints in these agreements are not necessarily ‘biting’ on services currently flown⁴).

In addition the use of especially Heathrow as a network hub (30% of passengers at Heathrow transit or transfer to another flight⁵), implies that there are network effects with

¹ *Stansted Market Power Assessment Initial Views*, Figure 19, paragraph 2.70 and Figure 3.

² Source: CAA

³ Passengers planning to travel from London to Belfast are unlikely to substitute to a flight from London to Paris.

⁴ For example services to Brazil, India and China generally have sufficient ‘headroom’ to allow more services to be operated.

⁵ Source: HAL marketing material quoted in *Heathrow Market Power Assessment consultation*, CAA, May 2013 paragraph 5.148

SLG ECONOMICS LTD

ECONOMICS, REGULATION, COMPETITION

demand for one route being dependent on the supply of other feeder routes (and with the size of the network as a whole). The greater the network effects (the more the route feeds into other routes and provides additional revenue opportunities on those other routes) the less the airport price rise is likely to feed through into retail prices.

There are a number of factors that are likely to influence the speed and degree to which airlines will pass through price increases to passengers:

- The size of the increase. Airlines might absorb small or *de minimis* increases in the short term and only pass them on as part of wider price increases over the longer term. Larger increases, however, would be likely to be passed through more rapidly.
- The frequency that airlines adjust their passenger fares. The more regularly this happens, the quicker cost increases are likely to be passed through to passengers in higher fares.⁶
- The extent to which the increase in cost is expected to be ongoing. Ongoing costs are more likely to be passed through to final customers.
- The existence of capacity constraints in the downstream firms (see discussion below).
- The extent and nature of competition between the downstream firms. If airlines are already competing strongly on price, their margins are likely to be low and they will have little choice but to pass on the increase. If, however, they are competing on quality or other metrics besides price, they might want to absorb the shock themselves. Even on individual flights there are likely to be differences in the level of competition between e.g. Business and standard passengers, tickets booked well in advance of the flight and those bought just before flying, refundable and non-refundable tickets etc. such that airlines are more likely to pass on cost rises to certain tickets/passengers than others.
- The extent of network effects whereby passengers transfer at the airport between flights.
- The ease with which passengers and airlines can switch to other airports. As stated in the CAA's market power consultations for Heathrow and Gatwick, there are likely to be significant barriers to airlines or passengers switching to other airports.

As a general rule, the greater the degree of competition in the particular retail market (either from competing operators, competing alternative transport modes or the threat

⁶ Airports are required to give airlines 4 months' notice of changes to airport charges under the Airport Charges Directive 2011, so there is unlikely to be a significant issue of airlines being unaware of airport price changes when setting passenger fares.

SLG ECONOMICS LTD

ECONOMICS, REGULATION, COMPETITION

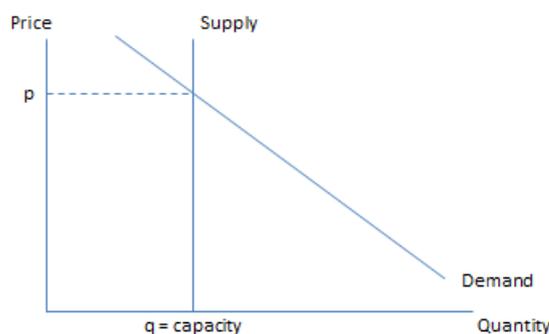
of competitive entry) the more the wholesale price rise is likely to flow through to retail prices.

The implications of airport capacity constraints on the sharing of rents

The DfT central forecasts of runway capacity at Heathrow and Gatwick estimate that they were at 99% and 90% of capacity respectively in 2010 and projected this to increase to 100% (i.e. runway or terminal capacity exceeded) by or before 2020 and to continue at 100% thereafter⁷. Given these capacity constraints in the supply of airport services (and assuming that measures to make more efficient use of existing capacity have already been exhausted and that there is unmet demand at the existing price), then an exogenous price rise will not affect the quantity of airport services consumed (there may be some switching effects if previously marginal services are withdrawn and replaced by new services that had previously been unable to purchase airport slots, but as long as the price rise does not ration demand below the available capacity, the overall quantity of air traffic movements will remain constrained to the maximum capacity of the airport).

If there were no opportunities for airlines to increase their capacity then this would imply that the supply curve in the retail market would be vertical (or near vertical) and given that the retail price is unregulated, the price would be the maximum the airlines could extract from the demand curve (Figure 5) – in this situation there is no advantage to airlines lowering prices to seek to gain more passengers since there is no capacity available to service those passengers. In this case an exogenous price rise in airport prices would be fully absorbed by the airlines with no feed-through to passengers.

Figure 5: The impact of capacity constraints



However airline capacity does not appear to be as constrained as airport capacity – BA load factor was 78.3% in 2011 and 79.9% in 2012⁸, implying that there is still some opportunity

⁷ DfT Aviation Forecasts 2012, assessments of UK airport runway capacity 2010-2050 'max use' scenario

⁸ Source: BA Accounts

SLG ECONOMICS LTD

ECONOMICS, REGULATION, COMPETITION

for them to increase the number of passengers carried on their existing aircraft by increasing the load factor and there may also be an opportunity to use larger aircraft to increase passenger volumes and refocusing the networks towards the most profitable high-yield routes⁹. Therefore the retail supply curve is likely to be upward sloping rather than vertical and as shown in Figure 4 above, increases in airport costs that shift the supply curve up vertically will be shared between airlines and passengers depending on the slope of the demand and supply curves.

As well as incurring airport charges, airlines at Heathrow and Gatwick also incur the opportunity cost of the slots that they operate – either the actual purchase cost of the slot, or the amount the existing user could sell the slot to another airline (the opportunity cost). The value of these slots can be substantial particularly at Heathrow) and will reflect the economic rent that can be captured by using the slot in the next best use (if the secondary slot trading market works well). Therefore to the extent that the airline is able to capture economic rent, much of this may not go to the existing airline operating the slot but to the original owner of the slot (or divided between the series of previous owners who have traded it on to the current owner). A well-functioning market for airport slots helps to ensure that competition works effectively in the retail market - that scarce airport capacity is used by the airlines that value it most highly and that these airlines offer price and service combinations that are most attractive to passengers – so that the interests of airlines and passengers are well aligned.¹⁰

The airline sector within the UK and Europe is now regarded as a generally very competitive market¹¹, while restrictions elsewhere on competition from bilateral agreements have generally either been removed or are not biting. Therefore, although the degree of competition will vary from route to route, one would expect a large part of any exogenous reduction in airport price to be passed on to passengers (if not the airline would lose passengers to competitors who do lower their price) and similarly airport price increases would lead to fare rises as airlines seek to maintain a minimum level of profitability.

This is consistent with the DfT's impact assessment analysis¹² which considers economic regulation as transferring surplus from airports to passengers and with the views expressed

⁹ See 'Aviation Policy for the Consumer' CAA Insight Note

¹⁰ See 'The extent to which airlines' interests are aligned with those of passengers', a report by CEPA for DfT, June 2010

¹¹ 'The extent to which airlines' interests are aligned with those of passengers', a report by CEPA for DfT, June 2010, paragraph 1.2

¹² *Reforming the framework for the economic regulation of airports*, DfT impact assessment, February 2013, paragraph 47

SLG ECONOMICS LTD

ECONOMICS, REGULATION, COMPETITION

by airlines in the Competition Report on BAA “*that higher airport charges would lead to higher fares, hence affect passengers*”¹³.

NERA prepared a briefing note for the CC on the effects of increases in airport charges at congested airports on airline fares.¹⁴ In this, NERA developed a simple model of airline behaviour which suggested that airport charges directly affect airline fares by altering price relevant marginal costs. While the direct price effect would be limited to airlines that were not capacity constrained, it could also affect price setting more widely if a capacity constrained airline competed with airlines that were not capacity constrained. The scale of fare increases in the NERA model depended on the expectations of market players – price increases would be stronger the more closely non-capacity constrained airlines expected their competitors to match any price increases they imposed following an increase in airport charges.

Looking at the empirical evidence over the last 10 years, both costs and air fares have fallen in real terms¹⁵ while there has been strong growth in GDP (a good proxy for passenger demand) – this suggests that airlines have not been able to capture much of the potential increase in economic rent associated with growing demand, instead the competitive pressures have led to cost reductions being passed through to customers as lower fares.

The implications of capacity being determined by government and the long term nature of airport investment

In a ‘normal’ market facing capacity constraints, with unmet demand and supernormal profits at current capacity levels, there would be a strong incentive to invest in increased capacity. The availability of supernormal profits would be a strong signal to new entrants and existing players to invest in new capacity which would increase the available quantity of the product supplied and reduce the price towards the competitive level. Therefore while consumers face higher prices in the short run, they gain the benefit of greater consumption and lower prices once extra capacity has been created.

Airport capacity expansion could come from new investment in facilities (e.g. an extra runway or terminal) at Heathrow or Gatwick, or from another airport expanding its facilities to offer an alternative to Heathrow or Gatwick. However investment in airport infrastructure is complex, lumpy and resource intensive and critically dependent on local and national planning restrictions (for example there is currently a government moratorium on airport expansion at Heathrow, Gatwick and Stansted). In addition the timescales for

¹³ Competition Commission Report on BAA, paragraph 2.36

¹⁴ *The effects of increases in airport charges at congested airports on airline fares*, NERA, Appendix 2.2 of the Competition Commission report

¹⁵ Source: CAA

SLG ECONOMICS LTD

ECONOMICS, REGULATION, COMPETITION

significant capacity expansions can be extremely long (for example Heathrow Terminal 5 took 19 years from conception to completion, including the longest public inquiry in British history¹⁶).

As a result high airport prices and/or profits (even in the presence of obvious capacity constraints) are unlikely to lead to increases in airport capacity in even the relatively long term – this is one of the key justifications for economic regulation of airports. Therefore consumers are likely to face high prices in the short run and in the longer run, and the distribution of the economic rent between airports and airlines will depend on the regulator's approach to charging. If an airport's prices are regulated to recover only its operating costs then all of the rent accrues to the airlines (potentially shared between the original slot owners and the existing airline), if it is allowed to charge the full LRIC of new investment (but does not undertake that investment for the reasons set out above) then part of the rents will accrue to the airport, while if the airport's charges are totally deregulated it may be able to capture most or all of the economic rent.

A secondary factor in the airport's ability to capture economic rent is its ability to price discriminate between flights with different levels of yield. Airlines have sophisticated dynamic yield management pricing systems that attempt to maximise the revenue from passengers based on characteristics such as: service level (first, business, economy), how early tickets are booked, whether tickets are refundable, remaining ticket availability etc. as well as the destination and timing of the flight. Airports have far fewer dimensions on which to base charges (flight timing and aircraft characteristics) and regulatory non-discrimination requirements may limit even these. This is likely to limit the airport's ability to capture the variation in rents between different flights.

The implications of single till regulation for the sharing of rents

The CAA's approach to setting airport charges takes account of the commercial profits from non-aeronautical services and deducts these from total projected cost for aeronautical services to derive the allowed aeronautical revenue. Thus the use of this 'single till' approach leads to a lower price cap than would otherwise be the case. It:

- Reflects pricing observed by competitive airports to drive their commercial revenues;
- Protects customers from the airport collecting rents from non-regulated products as all revenues are considered; and
- Removes the need for cost allocation of services that use the same infrastructure (which can be complex and costly).

The single till introduces a feedback loop whereby lower aeronautical charges increase passenger volumes which increase non-aeronautical revenues which lower aeronautical

¹⁶ The Terminal 5 public enquiry lasted nearly 4 years from May 1995 to March 1999

SLG ECONOMICS LTD

ECONOMICS, REGULATION, COMPETITION

charges. This is effectively a two-sided market where one side (aeronautical services) is likely to be priced below the stand-alone profit maximising price and the other (non-aeronautical services) gains higher volumes and therefore profits as a result. There is however a significant lag in the operation of this feedback loop, since the level of single till revenue is only assessed every 5 years as part of the price control review (the airport retains any non-aeronautical revenues above the regulatory expectations during the control period). Lower airport charges whose impact on non-aeronautical revenue are incorporated in the periodic review process will mean that airlines share some of the economic rent through higher non-aeronautical revenues feeding back within the single till calculation. Airlines will only however share in this effect as part of the single till calculation at periodic reviews.

The airport will still have an incentive to increase the charges to non-aeronautical retailers, since during the control period it keeps any outperformance against the regulatory expectations of non-aeronautical revenue. Given that it controls access to limited retail space it is likely to be able to extract most of the economic rent from the retailers.

The supply curve for non-aeronautical products is likely to be steep (but less steep than for aeronautical products), therefore suppliers of those goods are likely to keep most of the remaining economic rent available to them from the provision of those goods.

Cargo Markets

At Heathrow, 99% of cargo by volume is bellyhold cargo carried by FSCs and associated feeder traffic¹⁷ while 99.9% of cargo at Gatwick is bellyhold, principally on long-haul passenger flights¹⁸. The CAA considers that at Heathrow, cargo is part of the bundle of services that FSCs and feeder traffic demand and therefore in the same market, while it is a relatively small activity at Gatwick which does not merit separate consideration within the CAA's market power assessment.

Where cargo is part of a joint product (alongside passenger) that airlines procure from airports and it is the passenger demand that drives the demand for the joint product then the economics of the cargo users will follow that of passengers. To the extent that cargo operators are able increase flight loadings and switch to Stansted and other airports (and to use cargo only operations at those airports as an alternative), the retail supply curve will be upward sloping and any airport price change would be shared between cargo operators and cargo users.

Conclusions

¹⁷ *Consultation on Heathrow Market Power Assessment*, May 2013, paragraph 5.127

¹⁸ *Consultation on Gatwick Market Power Assessment*, May 2013, paragraph 2.48

SLG ECONOMICS LTD

ECONOMICS, REGULATION, COMPETITION

This analysis suggests that if a monopolist airport is allowed to exogenously increase (or reduce) its charges while there are capacity constraints in airport capacity, unmet demand and significant difficulties and delays in expanding airport capacity:

- There is unlikely to be an impact on usage of the airport – it will remain at full capacity and see an increase (or reduction) in its revenue accordingly. Effectively the economic regulator determines in its regulatory policy on charging how much of the economic rent is captured by the airport;
- Depending on the degree of competition in the retail market, airlines are likely to raise (or reduce) passenger fares and reduce (or increase) the availability of tickets by changing their aircraft load factors, the size of the planes operating their routes and their choice of routes – the greater the degree of competition in the relevant market, the more changes in airport charges are likely to feed through to passengers;
- The market for airport slots means that any economic rent that the airline is able to capture may be shared with the original slot owner (or the series of previous owners);
- Depending on the degree of competition in the retail market and the opportunities for demand-side substitution, passengers are likely to see some of the increase (or reduction) in airport charges flow through into higher (or lower) fares;
- The single till mechanism allows airlines to share some of the impact of changes in airport charges on non-aeronautical revenues, but only at periodic reviews;
- Cargo operation is likely to be a joint product (alongside passenger) and airport price changes are likely to be shared between cargo operators and cargo users depending on the level of competition and options for substitution in those markets, in the same way as for passenger airlines and passengers.

SLG Economics Ltd

September 2012