

Huw Merriman MP
Chair – Transport Select Committee
House of Commons

From: Paul Kellaway
Assistant Director –
Advocacy, Nations and External
Relations

7 December 2021

Dear Mr Merriman

Competition impacts of airport slot allocation

Thank you for taking the time to speak to Daniel Gordon and my colleagues on the CMA's work on Electric Vehicle Charging on 23 November 2021. At the end of that meeting I understand you expressed interest in the Competition and Markets Authority's portfolio of work on transport policy matters. In particular, you discussed the CMA's advice to the Department for Transport (DfT) on airport slot allocation, which I include as an attachment.

Since the CMA provided that advice we have also responded to the Aviation 2050 consultation on a range of competition and consumer matters.¹ Due to the impact of the pandemic on aviation, DfT has held several consultations on alleviation of the 'use it or lose it rules' which we have fed into through our regular discussions with DfT. The CMA continues to be of the view that there is a case for reform of slot allocation to ensure that passengers can benefit from competition between airlines.

Yours sincerely,

Paul Kellaway
Assistant Director – Advocacy, Nations and External Relations
advocacy@cma.gov.uk

¹ <https://www.gov.uk/government/publications/cmas-response-to-aviation-2050-the-future-of-uk-aviation>

Advice for the Department for Transport on competition impacts of airport slot allocation

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Advice for DfT on competition impacts of airport slot allocation

Summary

1. The current administrative system for airport slot allocation has a number of important weaknesses. From a competition perspective the system results in rigid slot holdings, especially at congested airports, that compound the underlying capacity constraint. As a result, airlines find it difficult to obtain additional slots to expand existing and launch new services; and competition in air services markets is constrained to the detriment of consumers.
2. This paper sets out advice for the DfT on the impact of airport slot allocation on competition and market efficiency. It is intended to provide high-level input to assist the DfT in considering possible changes to the current approach to airport slot allocation. This is particularly relevant in the context of the Aviation Strategy Green Paper and the debate about the allocation of future new capacity at Heathrow.
3. Overall, we consider that there are strong arguments for moving to a market-based approach to slot allocation.
 - a. There are clear efficiency benefits from auctions in principle. A market-based approach would lead to a greater allocation of slots to the most efficient user and may encourage greater innovation in the subsequent use of those slots.
 - b. It could also encourage stronger competition by reducing the incumbency advantage of the current regime and making it easier for entrants to enter and for smaller players to build up a portfolio of slots and expand their existing operations.
 - c. Increased competition and allocative efficiency is likely to lead to improved consumer outcomes, resulting in potentially greater choice and improved service quality.
 - d. We note that some of the benefits could be alternatively achieved through secondary trading in principle. However, this would not address the distributional inefficiency of the administrative approach. It is unclear to us that efficient secondary trading is feasible in this market and that secondary trading could address the competition problems with the current allocation system.

4. The main risk of auctions would be if they encouraged airlines with market power to bid a higher price than new entrants, and hence led to a greater concentration of slots in the hands of the incumbents. This would clearly be detrimental from a competition perspective. However, we consider that there are a number of ways that an auction could be designed to overcome these risks, for example by:
 - a. Guaranteeing a certain proportion of slots to new entrants (as currently happens within the administrative allocation system);
 - b. Capping the number/proportion of slots that could be purchased by specific airlines or groups;
 - c. Ensuring that there is a sufficient volume of slots available for auction to reduce the relative disadvantage faced by new entrants, if necessary by re-auctioning some existing slots in addition to new slots; and/or
 - d. Setting out a clear plan for the allocation of slot capacity over time so that all airlines are able to predict when new slots will become available.
5. It is likely that a market-based approach would lead to airlines paying higher prices for slots at constrained airports. However, to some extent this might be balanced by a reduction in other airport charges, depending on where auction revenues accrue. It is also not clear that airlines would pass on the costs to consumers, because greater competition will constrain pricing, and if slot payments were required to be paid upfront, would represent a fixed (sunk) cost rather than a variable cost.
6. A market-based allocation could also increase the risk for incumbent airlines, and it is important to consider what impact this might have on investment incentives and on capacity to invest. Many of these risks can be mitigated by auction design and in any case appear to be much less significant in the case of auctioning new capacity, since there is no risk of stranding existing investments (as well as no risk of disrupting existing operations). Therefore, we think that there is a strong case for moving to a market-based approach (e.g. auctions) to allocate slot capacity at capacity-constrained airports in the UK, and an even stronger case for doing so for allocating new capacity at Heathrow or Gatwick.

7. There are clearly many important details of the auction design that would need to be worked through. However, we note that in many ways spectrum auctions pose similar challenges, e.g.
 - a. Dealing with complementarities between products (i.e. the value of one slot depends on whether you hold other slots).
 - b. Dealing with market power of existing incumbents and ensuring that there are opportunities for entry.
8. Some of the issues, such as the risk of stranding assets, appear to be more challenging in relation to spectrum auctions than in relation to airline slots. We also note that the UK first used spectrum auctions to allocate new spectrum, akin to new airport slot capacity, rather than to reallocate existing spectrum between telecoms operators. Subsequently the Government extended the use of auctions to include the potential reallocation of existing spectrum. It should therefore be possible to learn from the experiences of spectrum auctions to help design and adapt an effective mechanism for auctioning airport slots.
9. We also consider that a potential move to auctioning new capacity at Heathrow or Gatwick could help address the challenge of pre-funding the infrastructure investment costs. Auctions potentially provide a way for airports and airlines to forward-contract for capacity, giving them greater security than to contribute to the investment costs of the infrastructure. If auctions are held far enough in advance of the capacity coming on stream, the revenues from the auction could be used to contribute to the pre-funding requirement. Further, this can also provide an opportunity for the successful airlines (including possibly new entrants) to forward-contract with the expanding airport in advance of the infrastructure becoming available. Winning airlines would make an advance contribution, with airport charges in the future, when the capacity is available, being off-set against what has been paid in the past.

Introduction

1. The shortcomings of the current administrative slot allocation process¹ are becoming more evident as demand for slots exceeds capacity at a number of key airports in the UK. In light of this and against a background of the UK's exit from the European Union (EU), which may lead to the EU slot regime ceasing to apply in the UK, the UK government has shown an interest in revisiting the slot allocation rules. These potential changes are being considered as part of the Government's Aviation Strategy.
2. The Department for Transport (DfT) asked the CMA for advice on the impact of the current airport slot allocation regime on competition, and the benefits and risks of adopting a market-based allocation mechanism (e.g. auctions).
3. This paper is the CMA's written advice and sets out broad economic principles which could form the basis for assessing different options for slot allocation. It also looks specifically at benefits and risks of auctioning the rights to access slots at capacity constrained airports, either for new and/or existing capacity. It, however, does not provide detailed empirical analysis on the effect of the current or alternative allocation mechanism on competition and efficiency. The findings of this paper should also be considered alongside the government's wider policy objectives. We also emphasise that any alternative to the current allocation mechanism would need to be carefully designed and implemented in order to deal with real-world complexities.
4. The remainder of the paper is structured in the following way:
 - a. First, we consider the effects of the existing slot allocation process on efficiency, competition and consumer outcomes.
 - b. Second, we outline options for introducing market mechanisms to allocate slots and the potential benefits and risks of these.
 - c. Third, we set out our conclusions on the overall case for change.

¹ See paragraph 11 for more detail.

Impacts of the existing slot allocation process on efficiency, competition and consumer outcomes

5. The slot allocation process can affect outcomes for consumers in two main ways:
 - a. First, by directly affecting the efficiency of slot allocation and usage.
 - b. Second, by having an indirect impact on competition between airlines and/or airports.
6. We begin with a brief description of the current approach to slot allocation. We then assess the impacts on efficiency and competition, first in the ‘business as usual’ case, and second in the case where a large quantity of new slots are released at an airport.

Summary of the current slot allocation process

7. The current airport slot allocation framework in the UK is governed by EC Regulations which apply to the location of capacity at congested airports throughout the EU.² Under the current framework, a slot is essentially a right to take off or land at a given airport at a given time.³ Slots are allocated through an administrative process rather than through an auction or market mechanism. In the UK, Airports Coordination Limited (ACL) manages this allocation process, independent from government, airlines and airport operators.
8. There is no initial payment for slots. Airlines pay a usage charge for landing at an airport. However, in most cases where capacity is constrained, and the airport charges are or have been regulated, this charge is less than the value of the slot. Although usage charges may

² We understand that the current rules for the allocation of slots at UK airports would remain unchanged if the UK leaves the EU without agreement (a ‘no deal’ scenario). The EU regulation for slot allocation would be retained by the EU Withdrawal Act, which requires slots to be allocated to airlines in a transparent and non-discriminatory way. The process for allocation of slots at EU airports will remain the same. For more information, please see <https://www.gov.uk/government/publications/flights-to-and-from-the-uk-if-theres-no-brex-it-deal/flights-to-and-from-the-uk-if-theres-no-brex-it-deal>

³ Council Regulation (EEC) No 95/93 of 18 January 1993 on common rules for the allocation of slots at Community airports, Article 2 states that: “slot” shall mean the permission given by a coordinator in accordance with this Regulation to use the full range of airport infrastructure necessary to operate an air service at a coordinated airport on a specific date and time for the purpose of landing or take-off as allocated by a coordinator in accordance with this Regulation”. In thinking about any reform of the existing arrangements it would be important to consider exactly what should be included within the slot product.

vary at different times of the day (for example peak versus off-peak), these differentials are unlikely to reflect true differences in the economic value of the slots to airlines.

9. Slots are 'grandfathered' to incumbent airlines from year to year, subject to use-it-or-lose-it (UIOLI) obligations.⁴ This means that, provided slots are used for a sufficient proportion of a season⁵, airlines have an indefinite right to retain them.
10. New slots, created either by new capacity⁶ or because existing slots are surrendered by airlines, are allocated through an administrative process.
11. Under the current rules, 50% of new slots are allocated to new entrants. Other airlines can submit bids for the remaining slots – incumbent airlines have no entitlement to any particular share of new capacity. ACL uses a range of criteria for allocation for which there are competing bids, including the size and type of market (for example, the level of services on a particular route), the frequency and 'local guidelines'⁷ that are agreed by the airlines, the airport operator, air traffic control and other users.⁸ Airlines make no payment for slots allocated from the slot pool.
12. Slots can also be traded bilaterally between airlines. There is no requirement to post prices, although all slot trades have to be reported.⁹

⁴ See paragraphs 17 and 18

⁵ Article 8 (1) and 8 (2) Regulation 95/93 "Grandfather rights entitle an airline to continue using the same slot in the next scheduling period, provided that it has used that slot for at least 80% of the previous period"

⁶ This can be for example, through operational changes at an airport by which more take-off or landing slots are made available, or through the provision of a new runway,

⁷ Local guidelines must be consistent with EU regulation.

⁸ These are based on the Worldwide Scheduling Guidelines published by the International Air Transport Association (IATA)

⁹ [Council Regulation \(EEC\) No 95/93](#) of 18 January 1993 on common rules for the allocation of slots at Community airports, Article 8a(2).

Impacts of slot allocation rules on efficiency

13. A key criticism of the current administrative approach to slot allocation is that it is unlikely to lead to the most efficient market outcome.¹⁰ This is because:
 - a. Airlines do not bear the scarcity value of the slots they hold. If airlines are simply granted slots at capacity-constrained airports rather than paying for them, then this represents a windfall to the airlines to which the slots are allocated. In a system where slots are grandfathered and capacity constraints are increasing over time, the value of the incumbents' slot allocation will increase over time. This transfer of value means that incumbent airlines may have an incentive to retain slots even if they are not being fully utilised.
 - b. There is also likely to be a misallocation of resource, in that slots are not necessarily held by airlines that can use the slots most efficiently.
14. Some features of the current slots regime seek to mitigate these inefficiencies. In particular:
 - a. It is possible for airlines to trade slots in the secondary market;
 - b. There are use-it-or-lose-it rules to ensure that airlines do not simply hold on to existing slots without using them; and
 - c. When new slots are allocated, 50% of capacity is reserved to new entrants.
15. However, these features appear unlikely to address all of the potential inefficiencies in the current allocation approach.
16. First, although secondary trading might be expected to lead to a more efficient allocation by allowing airlines to trade slots, it has several limitations in practice. These are discussed in more detail in paragraphs 40 to 44 below.
17. Second, while the use-it-or-use-it (UIOLI) rules are a pragmatic way of limiting the risks of under-utilisation of slots, they do not address the

¹⁰ NERA in its report "Study to assess the effects of different slot allocation schemes: a report for the European Commission, 2004" set out in detail some of the issues of the current allocation mechanism. In this paper, the CMA outlines its concerns that the current allocation mechanism has on market efficiency and competition.

core problem of allocative inefficiency. The UIOLI rules constrain the extent to which incumbents can under-use scarce capacity, but do not create an incentive for slots to be transferred to other operators who might use them more efficiently. It could also create incentives for airlines to use slots to operate flights, absent these rules, that would otherwise not have been undertaken, in order for the airlines to retain the use of slots for the following seasons.

18. Third, the rule that 50% of new slots are reserved for new entrants should help alleviate barriers to entry and encourage new competitors into the market. However, as with UIOLI, the new entrant rule does not directly address the efficiency concerns. It also risks creating unintended consequences including increasing the number of very small operators, whereas consumers may be better served by a smaller number of slightly larger operators.
19. Overall, while these rules mitigate against some of the inefficiencies in the administrative allocation process, they are unlikely to be appropriate for all airports all of the time.

Impacts on competition between airlines

20. Aside from direct efficiency effects, the current slot allocation approach is likely to interact with competition between airlines in at least two ways.
21. First, at a capacity-constrained airport, slots represent a key barrier to entry. Slots are an essential input for airlines wanting to compete. If we assume that there is limited substitutability between airports, then airlines wanting to enter a particular route will need to purchase slots from one of the incumbents.¹¹ If slots are allocated on a continuous basis to incumbents then this will tend to reinforce the market power of incumbent operators. By contrast, a market-based allocation mechanism, could help reduce barriers to entry and expansion, provided that it includes provisions to guard against higher bid valuations resulting from market power.¹² It would also ensure that entrants and smaller players do not face an additional cost of buying

¹¹ We note that the degree of substitution between airports may vary. For example, multiple airports that serve a single city could be expected to have a higher degree of substitutability than airports that serve different cities. The degree of substitutability can also be expected to vary depending on the operation model of the airline e.g. whether it primarily operates a point-to-point network from an airport or whether the airport represents a hub in a hub-and-spoke operation model.

¹² The impact of market power on auction outcomes is discussed further at paragraph 54 onwards.

into the market (e.g. through secondary trades) that is not faced by the incumbents.

22. Second, to the extent that airlines have market power, under the current slot allocation arrangements, these airlines may have a unilateral incentive to retain slots even if these are not being fully utilised, to prevent entry and expansion by competitors. The argument here is not just that the incumbent may lack the incentive to use a slot efficiently, but that it might have an active interest in not giving up a slot to a competitor for strategic reasons, to maintain its market power.

Impacts on competition between airports

23. We also considered whether the slot regime might affect competition between airports.
24. In general terms, an expansion of capacity at any given airport (i.e. release of more slots) should increase the ability of airports to compete with one another. This is because there will be a higher probability that the airport will be able to service routes which compete directly with those offered by nearby airports and thus attract passengers that would previously have used the alternative, competitor airport.
25. To the extent that there is misallocation or underuse of slots, or deliberate withholding of slot capacity by airlines from competitors as a result of the current regime, then at the margin this could also reduce inter-airport competition. Concentration of different airlines at different airports could also lead to airports increasingly serving discrete customer segments – for example low cost, business, mid-tier and so on – reducing choice for consumers in those segments. Again, this effect might be exacerbated by grandfathering of existing slot rights.
26. We suspect that the magnitude of these effects is likely to be smaller than the impacts of the slot regime on competition between airlines at a given airport. However, they should be considered as part of any overall assessment of proposed changes to slot allocation.

Allocation of new runway capacity

27. In this section we consider how the current slot allocation regime might affect efficiency and competition if a significant volume of new slots were introduced at an airport.

28. For illustrative purposes, we have first considered likely effects if an extreme, and potentially unlikely approach was taken whereby new slots were allocated in proportion to the current slot allocation at Heathrow, without an allocation being reserved to new entrants. Based on the principles established in the previous section, if we assume that capacity still has a scarcity value even after the expansion (which appears realistic in the case of Heathrow), then there would be a transfer of value to the incumbent airlines.¹³
29. Even if slots were simply grandfathered in this way, capacity expansion in principle is likely to lead to greater competition between existing airlines. However, this does not mean that the approach to slot allocation has no effect. In particular:
 - a. The concerns about allocative inefficiency described above in relation to the status quo position would apply also to the allocation of new capacity.
 - b. In addition, if slots are granted to incumbent airlines then there might also be an increased incentive to hoard slots because there is a greater benefit to the incumbent from avoiding competition. In a situation where capacity is highly constrained, competitive pressure is likely to be low even where there are several airlines who operate slots. As capacity constraints are relaxed, the scope for competition increases. However, this equally gives airlines a greater incentive to hoard their existing slots to maintain market power and prevent competitors from entering or expanding.
30. These effects might change in a situation where a proportion of slots are reserved to new entrants as is the case under the existing slot allocation arrangements. If a similar approach were followed in allocating a significant volume of new slots at Heathrow, we might expect this positively to encourage and support new entry.
31. However, the 50% rule is a relatively crude way of seeking to mitigate incumbent market power. It does not remove barriers to expansion for an existing airline if it does not qualify as a new entrant.¹⁴ Particularly at larger airports, this could lead to a situation where there is an

¹³ We note that there is also likely to be a reduction in the value of incumbents' existing inframarginal slot holdings.

¹⁴ An airline is considered a new entrant at an airport on a particular day if, upon allocation, it would hold fewer than five slots in total on that day or, for an intra-EU route with less than three competitors, hold fewer than five slots for that route.

inefficiently large number of fringe competitors that are not able to build up sufficient scale. There is also a risk that sub-scale entry could then allow larger airline groups to buy up new entrant airlines (and their slots) later, thereby reinforcing their position at the airport. Instead, arguably the most important way of supporting strong competition is to allow smaller airlines to be able to grow rapidly to benefit from economies of scale and better challenge the incumbents.

32. The 50% allocation rule could also be open to gaming. For example, there could be an incentive for entrants to acquire slots and then sell them on to existing incumbents.¹⁵ While it might be possible to address some of these concerns through the introduction of additional rules (for example, preventing slots allocated to a new entrant being sold on for a given period, or scrutinising any slot sales to ensure that there are no competition concerns), these are all in some sense ‘second best’ solutions.
33. Finally, it is important to note that the 50% allocation rule could, in principle, be continued even if slots were auctioned. In this sense, the idea of reserving some slots for new entrants should be viewed as a separate policy decision from the core question of whether slots should be allocated through a market-based mechanism. Whether any rules are required to address issues of airline market power, and what these rules should be, would be an issue to be addressed as part of any auction design.

Impact on consumer outcomes

34. As explained above, the administrative slot allocation process has had a restrictive effect on slot mobility and has created significant barriers to entry and expansion. This has exacerbated the market power of incumbent airlines that hold slots at capacity constrained airports. We consider that this has potentially led to:
 - a. Less choice of airline and routes for consumers, as entrants are restricted from accessing slots.

¹⁵ Slots allocated under “New Entrant” priority are restricted to the original allocated route for a minimum of two equivalent seasons. A new entrant would therefore have to hold and operate the route for at least two seasons before selling on the slot.

- b. Reduction in service quality as incumbent airlines are less incentivised to innovate because they face less competition on a particular route.
 - c. Higher airfares as there are fewer airlines competing with each other at capacity constrained airports.
35. On the other hand, a hub carrier could reasonably argue that having high slot concentration at capacity constrained airports like Heathrow enables it to exploit network effects to the fullest extent possible with associated benefits for consumers in the form a more comprehensive timetable and network of destinations. We, however, consider that the increased efficiency and greater competition for slots has the potential to generate a wider range of benefits to consumers.

Conclusions on the impact of the current slot allocation arrangements

36. The analysis set out above suggests that the existing allocation system, even when combined with a secondary slot trading market, is likely to lead to a transfer of value to incumbent airlines and inefficient slot use. It could also weaken airline competition in several ways:
- a. It could make it difficult for new entrants to build up sufficient slot holdings – particularly as it may be necessary to build up a portfolio of slots to be an effective competitor.
 - b. There may be an incentive for airlines with market power to hoard slots and/or use slots inefficiently in an attempt to exclude entry.
 - c. These concerns could be exacerbated by an expansion in airport slot capacity because the scope for price competition would increase, and hence there would be greater incentive for incumbents to deter entry in order to maintain their market power.
 - d. There may also be concerns that the slot allocation regime can help facilitate coordination between the airlines, particularly by making it harder for entrants to challenge the existing position of the incumbents.
37. Ultimately the case for change depends on how far an alternative market allocation would be able to address the issues with the current system – i.e. secure a more efficient allocation and mitigate the competition concerns. This is considered in the next section.

Options for using market mechanisms to allocate slots

38. This section considers the benefits and risks of introducing a market-based allocation mechanism for airport slots as an alternative to the current administrative approach.
39. First, we briefly outline the extent to which secondary trading might address the efficiency and competition problems of the current system. We then consider in more detail the case for the use of auctions for the primary allocation of slots. This might be either in the context of allocating new capacity (such as from a new airport runway) or of reallocating existing capacity.

Secondary trading

40. The most straightforward way in which market mechanisms can be used to reallocate slot capacity is through secondary trading. This involves airlines with current slot capacity agreeing to sell some or all of their slots to a competitor. As outlined above, secondary trading is already permitted at airports in the UK.
41. In principle, secondary trading might be expected to lead to a more efficient allocation by allowing airlines to trade slots between themselves. A competitor that believes it is able to use a slot more productively than the incumbent slot owner should be willing to pay a price which reflects the value they place on that capacity. Both the competitor and the incumbent gain from the trade and overall allocative efficiency should be improved.
42. However, there are several limitations to secondary trading in practice:
 - a. If an airline or airlines have market power at a capacity constrained airport, such an airline would value the slot more highly than would an entrant, reflecting the value that is derived from its market power. This could lead to the retention of slots by potentially less efficient users of the slots and exacerbate concerns about market power.¹⁶

¹⁶ We note that this is also a risk with a primary auction of new capacity. We discuss these risks further below at paragraphs 54 to 60.

- b. There is currently a relatively small amount of secondary trading.¹⁷ This would make it difficult for an entrant to be able to acquire slots, particularly in sufficient volumes to establish a viable competitive operation at an airport, for example to offer a sufficient frequency of service on the routes that it is interested in serving.
 - c. Secondary trading could frustrate competition as slots that would otherwise be returned to the pool would not necessarily be allocated to new entrants.
 - d. Finally, secondary trading does not address the distributional impacts of the initial allocation – new entrants would have to pay to enter, whereas incumbents would benefit from the windfall of being allocated slots in the first place through an administrative system.
43. It may be possible to make the secondary trading market function more effectively than it does at present. For example, to increase liquidity by centralising the trading system and requiring the prices of slot trades to be reported. We have not considered these options in detail but would encourage the DfT to explore ways of improving the secondary trading arrangements as part of its consultation.
44. However, we consider that strategic conduct by incumbent slot holders is likely to act as a real constraint on the effective functioning of secondary trading. Additionally, we note that some of the characteristics of airports slots – e.g. the fact that there is a relatively limited number of slots traded at each airport, and that slots can be differentiated (e.g. between peak and off-peak)¹⁸ – appear to place real limits on the degree of liquidity that might be achieved. Given these issues, it is unlikely that secondary trading in isolation, even if improved, will address the problems of the current allocation mechanism.

¹⁷ Airlines could have an incentive to avoid selling slots to a competitor as this could reduce the overall profitability of its operations, so would rather hold slots for the longer term, even though it could benefit from a short term-windfall.

¹⁸ We note that this may not be the case for all airports. For example, Heathrow does not have peak and off-peak pricing as it is always a peak. This may change if there is increased capacity.

Benefits of auctioning slot rights

45. The most direct way of using market mechanisms for slot allocation would be to introduce primary auctions, rather than relying on secondary trading to adjust the initial administrative allocation.¹⁹
46. In principle, auctions could be used in two ways:
 - a. As a means of allocating new airport capacity – for example this might result from new infrastructure build (for example at Heathrow Airport, as set out in the Government's Aviation Strategy Green paper, or at Gatwick Airport, as set out in its consultation on using its standby runway to deliver additional capacity); or from incremental additional capacity delivered at an airport through the introduction of changes in ground operations to make available additional slots.
 - b. As a means of reallocating existing slots – this would involve the withdrawal and suspension of existing rights and would require incumbents to bid for their slots alongside potential or existing competitors. As explained in paragraph 64.b, auctioning of existing capacity may create some practical problems for airlines, including the risk of stranded assets.
47. Although these two situations bring different challenges and risks (as discussed further below), the potential benefits are similar.
48. A well-designed auction should achieve two key aims:
 - a. Firstly, it is more likely to allocate resources to those who can use them most efficiently.²⁰ Rather than relying on administrators to assess the most efficient user of a slot, it forces firms to support their investment decisions by paying an upfront fee. In a competitive auction, bidders will bid (close to) their willingness to pay, so the airline that values a slot the highest will win the auction. The auction extracts and uses information otherwise unavailable to an administrator.

¹⁹ We note that there may be possible alternative approaches that fall somewhere between the current administrative approach and the use of primary auctions. For example, it may be possible to introduce administrative pricing based on estimates of the market value of slots at different times of the day.

²⁰ As discussed earlier, in practice secondary trading is likely have additional transaction costs which reduces efficiency.

- b. Secondly, a competitive auction mitigates harmful market power and therefore enhances consumer welfare through lower prices and/or improved quality of service.
- 49. The costs of slot auctions to airlines may drive innovative behaviours which potentially increase capacity as airlines seek to optimise returns on their investment costs. For example, airlines might have an incentive to:²¹
 - a. Use larger aircraft to recover the costs of a slot over a larger number of passengers.
 - b. Operate longer distance flights so the price of a slot would then be a smaller part of the total cost of the flight.

Increasing capacity could lead to lower air fares, increased connectivity and/or greater quality of service in the long run. This is due to the entrance of new firms into the market, incentivising incumbents to reduce price and improve quality in order to compete for passenger demand.

- 50. The administrative mechanism which has grandfathered slots means that some slots have been held by airlines for a long period, meaning that the allocation has not evolved fully to reflect and incorporate changes to the market. It is unlikely that all incumbent slot holders are the most efficient users of those slots.
- 51. The nature of an administrative allocation is that it is more open to political and legal interference, or perception of interference. In general, an administrative allocation process can be opaque and time-consuming.²² Auctions generally are less prone to these types of problems.
- 52. Given existing capacity constraints, auctions for existing slots will likely raise substantial revenues placing additional costs on incumbent airlines. There will be a transfer of any 'scarcity rents' currently

²¹ To comply with the "use it or lose it" rule, many airlines resort to artifice—flying smaller planes than necessary in order to spread capacity across their slots, for example, and even running empty "ghost" flights to ensure that the runways are busy at the appointed time. So instead of slots being recycled from established carriers to new ones, they are clung to. One analysis showed that only 0.4% of London Heathrow's total slots and 0.7% of Paris Charles de Gaulle's were allocated to new entrants during the period under study [The Economist - <https://www.economist.com/leaders/2017/11/16/the-system-for-allocating-airport-slots-is-broken>]

²² We have no view on whether the administrative process of ACL is any more or less efficient than other administrative processes.

captured by incumbent airlines to the recipient(s) of auction revenue. The extent of transfer will be dependent on auction design (e.g. first price/second price auctions), characteristics of demand at specific airports and whether the airport is price regulated and the basis of the price regulation.²³ Depending on how revenues are distributed and the incentives of the recipients, there is potential to use revenues generated from the auction to support further investment in surface access, airport facilities, new capacity etc., which may result in further benefits to consumers.

Risks of auctioning slot rights

53. From a competition perspective, the main risk of auctions is that they might inadvertently reinforce the market power of incumbent airlines. Several other concerns are also commonly raised, including that auctions impose an unfair cost on firms, could raise consumer prices and might lead to a reduction in investment. We consider these points in turn below.

Impact of market power on auction outcomes

54. We would expect the first-order impact of introducing market allocation mechanisms to be to strengthen competition between airlines. An auction provides an opportunity for entrants and smaller existing players to build up slot capacity quickly where this is efficient and to challenge incumbents. This is very difficult to do under the current allocation arrangements and secondary trading.
55. However, there are some risks that might be raised if incumbent airlines start from a position of market power. One concern is that auctions could reinforce barriers to entry because new entrants would have to pay significant amounts to purchase slots. However, it is not clear why auctions should lead to any greater barrier than the existing arrangements where entrants have to buy slots through the secondary market. Winning bidders should be able to finance their auction fees as these will reflect expected future profits.
56. A much more significant concern is that airlines with market power are likely to have higher marginal valuation for slots because their market

²³ Heathrow is the only UK airport currently subject to price regulation. The current price control is a cost-based, RPI-X form of control. This limits the extent to which any scarcity rents present at Heathrow can be captured by the airport.

power allows them to make greater profits than a new entrant. Incumbent bidders with market power may therefore be expected to bid more aggressively to secure slots. This in turn could discourage bids from smaller players and potential entrants and lead to an increase in concentration. Additionally, the overall outcome of the auction may not lead to the most efficient allocation from consumers' perspective.

57. These issues are very important to consider in auction design. We note that auctions can be designed to facilitate new entry by allocating a proportion of slots to new entrants or capping the number/proportion of slots that could be purchased by specific airlines or groups. While auction design cannot by itself entirely solve the problem of market power or lack of competition, it may be able to mitigate it to a significant degree.
58. We also note that the extent of the distortion caused by incumbents' market power is likely to be inversely related to the volume of slots being allocated at any one time. If a significant portion of the total capacity at an airport is auctioned, then new entrants would be able to build their own strong position by bidding for a large number of slots. By contrast, if only a small number of slots are auctioned, then it is more likely that an incumbent airline with market power would be willing to bid a higher price for the slots than a new entrant as a result of its higher market valuation.
59. This suggests that market power concerns might be less significant if there is a large amount of new capacity being introduced at an airport at one time. It might also point towards the benefits of combining new slot capacity with the reallocation of at least some of the existing slot rights, which would increase the overall capacity that could be bid for by an entrant or existing smaller operator.
60. Finally, there may be a benefit in having a clear plan for future release of slots which is transparent to all of the bidders. This would allow them to plan on the basis of possible future capacity, even if they are only able to bid for a small number of slots in the short term.

Impact on airline costs and consumer prices

61. Another common concern with auctions is that they might increase prices for consumers. The introduction of a market-based allocation mechanism means that incumbents that previously received slots without charge would have to bid and compete for slots. All else being

equal, this could be expected to increase their overall costs of operating slots.

62. However, there are several reasons why auction fees might not be expected to be passed through into consumer prices:
 - a. First, as long as the auction is designed in a way to ensure that the fees paid by the winning airlines are upfront, one-off, sunk costs²⁴ these should not impact on how airlines set their prices (which will be driven by marginal operating costs).²⁵ The likely effect of auction fees would be to decrease incumbents' airline profit margins. Airlines may seek to recover some of the sunk costs, for example by lobbying to reduce airport charges. In practice, airlines may be under pressure to meet profit margin targets which mean that they may seek to increase prices or reduce quality of outputs at the margins. However, the benefits of allocating slots to more efficient airlines will, in the long run, likely lead to lower prices and/or higher quality outputs from greater innovation. One practical example of this is the impact of the 3G spectrum auctions in the early 2000s, which entailed very significant expenditure by the telecoms operators (around £22bn in total), but where most of the risk was taken by investors rather than consumers, and price competition remained strong.
 - b. Second, the extent of the increase in overall costs will depend on how the auction revenue is distributed. From a theoretical perspective, the increase in costs represents a transfer of 'scarcity rents' from incumbent slot holders to the recipients of auctions' revenue (e.g. the government, the airports or a mix of both). To the extent that the value of slots is currently captured within airport landing charges, there would be the potential for using some of the auction revenues to offset some of these charges in future.

²⁴ If there is a properly functioning secondary trading mechanism in the post auction market, sunk costs may be low.

²⁵ The alternative option to have a system of royalties rather a one-off lump sum payment is another way of prompting entry, because it allows the government to share the risk with an operator and because new entrants are likely to make smaller payments for any royalty rate. Binmore and Klemperer, both of whom designed the UK's first telecom spectrum auctions, reported that for a variety of different reasons that it was right to opt for a lump sum payment. A royalty would have to be levied on some genuinely observable variable, for example some function of revenue, but they noted that a revenue-based royalty corresponds to a 'value added tax' and accordingly would have created deadweight loss in an oligopolistic industry such as telecoms. A similar distortionary effect may crystallise if such an approach was taken for airport slots.

63. Overall, if the auction is designed appropriately there are good reasons for thinking that there is unlikely to be a significant impact on customer prices, and that there should be downward pressure on prices, greater connectivity and/or improved quality of service because of stronger competition.

Impact on risk and investment by airlines

64. There may also be concerns about the impact of auctions on the risk faced by airlines, and on their willingness and ability to invest. Auctions could affect airlines' risk for at least two reasons.
- a. First, it could be argued that the large auction fees may slow investment because of capital market constraints. The increased operating cost base may increase credit risk and potentially firms' cost of capital. It is conceivable that other profitable investments are forgone to fund auction fees because of a difficulty in raising funding. However, the extent of any potential harm is dependent on the total cost of auction fees and the level of investment that was expected to take place, absent the auction.²⁶ It could also be the case that more competition leads to an increase in investment.
 - b. Second, withdrawing slots and periodically auctioning them could create the risk of practical problems for airlines and stranding of investments:
 - i. Planning of networks, staffing, fleets and other capital investments may become more difficult arising from the uncertainty. Airlines may be more reluctant to invest in new aircraft because of the uncertainty as to how to deploy them.
 - ii. The dynamic effect where slots are periodically reauctioned creates a trade-off between facilitating entry and exit, while on the other hand increases the risk that airlines might make investments that become stranded in future periods because they fail to win slots in future auctions.

²⁶ See 'The Biggest Auction Ever: The Sale of the British 3G Telecom Licences'; Binmore and Klemperer (2002). They note the "fact that Telefonica's consortium spent over \$7 billion on a licence in Germany and almost nothing on its Spanish licence is obviously not an argument for Telefonica to invest less in Germany than in Spain. In fact, some commentators have suggested the opposite, arguing that internal-organisational incentives will drive firms to launch their services faster in Germany to demonstrate that they can quickly recoup their auction costs. Indeed, two of the winners of the UK licences have said that the high price they paid for licences in the auction encouraged them to develop 3G services faster than if the spectrum had been given away."

65. There is a potential that introducing auctions for existing capacity could increase investment risks at least for incumbent airlines. The extent of disruption, however, could be managed by the design and timings of auctions, i.e. auctioning a proportion of existing capacity periodically rather than auctioning all capacity in one auction. Moreover, this concern would be less significant for an auction of new capacity (e.g. resulting from Heathrow expansion or Gatwick airport using its standby runway to deliver additional new slot capacity), because this would not affect airlines' existing investments.
66. More generally, the scale of the potential risk of stranded assets depends, among other things, on the length of airlines' investments and the extent to which the costs are sunk. For example, many of the assets used for flights (e.g. aircraft) could easily be sold on or redeployed to other routes. In general, the airline sector appears to be able to reuse its assets more readily than other sectors in which the government has used auctions in the past (for example, mobile telephony).
67. Furthermore, auction design can help overcome some of the investment risks. For example, phased auctions in which a proportion of slots is allocated at any one time could allow airlines to manage their investments better than if all slots were allocated in one auction.

Other potential issues

68. Finally, we note some other potential objections that might be raised to the introduction of auctions as a method of allocating slots:
 - a. *Efficiency of outcomes* – it may be challenging to achieve efficiency in an auction where there are multiple differentiated products (i.e. different slot times) and interactions between different slots, as this may lead to a very complex auction design. This may have consequences on the degree of participation. It will be important for any auction design to provide for relatively straightforward decision-making for bidders to allow them to make well-informed choices, albeit that the underlying auction mechanism may be relatively complex.²⁷

²⁷ Spectrum auctions have posed similar challenges and approaches have been developed in those contexts (e.g. combinatorial auctions and multi-stage allocation processes).

- b. *Winner's curse* – airlines would be subject to a risk that auction prices may be higher than anticipated. A related risk is that the winning bidder in a public value auction will typically overbid for the asset. Further, these risks can in any case be managed to some extent by the design of the auction, for example using a second-price rule, which requires that the winning bidder pays the amount bid by the second highest bidder.
 - c. *Potential for coordinated effects* – bidders may be able to coordinate in an auction through various forms of signalling, with the aim of reducing the amount they pay for slots. The impact of this could be to reduce the level of competition within the auction, leading to a potentially inefficient allocation of slots.
 - d. *Increased financial risks to airlines* – in a sector that already has low operating profit margins, and given the cyclical nature of the airline industry,²⁸ increasing costs may push the least efficient airlines out of business. While this may lead to a more efficient and effective market in the medium to long term, there may be unintended consequences from an aviation policy perspective. For example, if an airline went into administration, passengers are likely to face significant disruption. However, this risk could be mitigated by allowing airlines time to plan for a slot auction and being explicit about forward auction timetabling.
 - e. *Reduced competitive advantage of UK carriers* – under the assumption that UK carriers hold a greater proportion of slots at UK airports than outside the UK (relative to foreign airlines), the additional cost of acquiring slots may put them at a competitive disadvantage with foreign airlines that do not face equivalent costs at their hubs.
69. As discussed, some of the risks outlined above can be addressed by the configuration of the auction while others are inherent to adopting a market-based approach to allocation.²⁹
70. There may be wider policy issues outside the scope of this note that the DfT and CAA may wish to consider. If UK carriers are unable to acquire slots at UK airports, either because they are not the highest value user or because these slots are acquired by other national

²⁸ At the moment, many UK airlines are profitable, but this can change quickly (and has done in the past).

²⁹ It is worth considering whether WSG guidelines on slot allocation fetter the UK's discretion to make radical changes but we note that IATA has no enforcement powers.

flagship carriers, these issues may impact on other aspects of the UK's aviation strategy, such as UK domestic connectivity. Although such issues are unlikely to impact directly on competition, it may be possible to mitigate against some of these risks in the design of the auction.

Conclusions

71. The current slot allocation mechanism has a number of weaknesses, which has created rigid incumbent slot holdings that are slow to respond to changes in demand. This inertia has created significant barriers to entry and expansion. It has made it more difficult for airlines to obtain slots to expand existing and/or launch new services. By contrast, incumbent airlines with grandfathered rights are able to hold onto slots regardless of the service they provide. This has resulted in a loss of allocative efficiency and has constrained competition between airlines to the detriment of consumers through lower quality of service and choice.
72. Reducing the restrictions on secondary trading, such as increasing transparency of market prices, would help address some of the competition problems of the current system. Airlines would be able to respond to the opportunity cost of holding a slot, and if markets operate efficiently, airlines would in principle select the best option to maximise profits. However, if airlines are slow to respond to changes in secondary trading, and airlines expect liquidity to be limited in the future, then incumbent airlines would be less willing to trade and the lack of liquidity becomes self-reinforcing. The barriers to entry and expansion would therefore remain high.
73. The removal of the grandfathered rights and auctioning of slots should increase market efficiency and allow for greater competition between airlines. Airlines would be able to compete to access slots periodically, which will lead to slots being used by the airlines that can use them most efficiently. New entrants would be able to increase their slot concentration quickly and be able to provide more competition to incumbent airlines on particular routes. The result of which should lead to better consumer outcomes, as airlines have a greater incentive to optimise their investment and encourage greater innovation in the subsequent use of slots.
74. Auctioning slots is not without risks. From the perspective of airlines, there is an increased risk of disruption and reduced security if slots are auctioned periodically. This could lead to the risk of stranded assets, which is likely to be more pronounced if existing capacity is auctioned.

The primary risk of auctions is that incumbent airlines which already hold slots may value slots more than new entrants, which could potentially lead to incumbent airlines increasing their slot concentration and thereby exacerbating their market power. This could potentially in the long run lead to consolidation with fewer airlines in the market. This would be detrimental to competition. These are important factors to consider when designing the auction and could be overcome, for example by:

- a. Guaranteeing a certain proportion of slots to new entrants (as currently happens within the administrative allocation system);
 - b. Capping the number/proportion of slots that could be purchased by specific airlines or groups;
 - c. Ensuring that there is a sufficient volume of slots available for auction to reduce the relative disadvantage faced by new entrants, if necessary by re-auctioning some existing slots in addition to new slots; and/or
 - d. Setting out a clear plan for the allocation of slot capacity over time so that all airlines are able to predict when new slots will become available.
75. Overall, we consider that there is a strong case to move to a market-based approach to allocate slots.